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"Scire est nescire, nisi id me
Scire alius sciret."

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TUBERCULOSIS.

BY

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IT is usual for the President to inaugurate his term of office by an address, and in choosing a subject suitable for the occasion I found myself face to face with two great topics which are at present engaging the attention both of the medical profession and of the general public to a degree beyond all previous experience—topics interesting alike and of first-rate importance from the points of view of medical science, of sociology, and eugenics. I refer to *tuberculosis* and to the problem of the *feeble-minded.* The former subject is so insistent at the present time in its claims on our attention, that although medical literature teems with it in its many aspects and phases, I venture to think that a brief historical survey of the evolution of our modern treatment of pulmonary tuberculosis, with some

comments on that treatment as it stands to-day, may not be out of place.

It is obvious that a consistent and appropriate method of treating any disease must be based on the conception held of its pathology. Cullen, in his *First Lines of the Practice of Physic*, published in 1774, defines phthisis pulmonalis as "an expectoration of pus or purulent matter from the lungs attended with a hectic fever." He refers its causation to five separate heads—(1) Hæmoptysis, (2) suppuration of the lungs in consequence of pneumonia, (3) catarrh, (4) asthma, and (5) tubercles. This curious etiology, which seems to us to confound symptoms with pathological entities, leads up to a special emphasis being laid on the last head, tubercle, which he pronounces much the most frequent cause of any, and which he believes to be due to an "acrimony" in the blood producing these indurations. Cullen's views of treatment were conditioned by what he regarded as the particular category to which the case belonged. "A phthisis from tubercles," he says, "has I think been recovered; but it is of all others the most dangerous, and when arising from a hereditary taint is almost certainly fatal." His treatment, based on the idea that what the physician had to do was to avoid *inflammation of the tubercles*, was a general anti-phlogistic regimen, including blood-letting and low diet, a total abstinence from animal food, and the using of vegetable food almost alone. He admitted milk somewhat grudgingly to this diet. A second element of treatment was to avoid any violent exercise of respiration, any considerable degree of bodily exercise, any position of the body which straitens (*i.e.* narrows) the capacity of the thorax, and lastly, cold affecting the surface of the body, which might determine blood to the internal parts. Blisters and issues applied to the thorax were advocated as removing determination of blood to the pulmonary vessels. He had little to say in favour of such modes of "gestation" as riding on horseback or travelling in a carriage, but he strongly recommended sailing in boats on the sea as involving a passive kind of movement and a pure air. It is not, perhaps, surprising that if Cullen's principles just described were widely propagated, as

no doubt they were, a system of anti-phlogistic treatment became general in dealing with phthisis which that really great physician might in many instances himself have disapproved, and which lingered on well into the Victorian era.

The literature of the late eighteenth and early nineteenth centuries reflects the popular notions about consumption. " Going into a decline " meant being shut up in a warm room, being dedicated to hopeless invalidism, and waiting for inevitable early death.

By his penetrating genius and accurate observation Laennec unified the pathology of tubercular phthisis. While holding that pneumonia or pleurisy might precede, accompany, or follow tuberculous lesions, he maintained that tuberculosis was due to a specific constitutional affection, whose cause was then beyond reach and could not be defined, but *was not primarily an inflammation.* One of the sections of his classical treatise on mediate auscultation (second edition, published 1826) is headed " Is Phthisis Curable ? " Laennec's answer to this question seems strangely at variance with what we now regard as the most demonstrable of all pathological facts, viz. the curability of " closed cases." He declares the idea of cure in the early stages to be perfectly illusive, but that in the later stages—*after* softening of the tubercles and formation of an ulcerous excavation—cure is possible in some cases. Under medicinal or other therapeutic means used in his day he mentions (though certainly without approval) the vapours produced by sublimating zinc, lead, sulphur, etc., the air of cow-houses, that of stagnant water, the snuff of candles, the inhalation of oxygen, sulphuretted hydrogen and carbonic acid, and for internal use a multitude of substances, such as acorns (roasted or raw), different kinds of mushrooms, shell fish, frogs and vipers, millipedes, wolf's bane (one of the aconites), chocolate, sugar of roses. Other methods employed were mercurial salivation and frequently-repeated emetics.

Laennec, to his credit, condemned such empirical absurdities, while in change to a marine atmosphere he saw the most hopeful means of amelioration, and always recommended when possible

a sea voyage and a residence on the sea-coast in a mild climate. He went so far as to endeavour to produce a marine atmosphere for his hospital patients in Paris by hanging up fresh seaweed in the wards!

There can be no doubt that the fatal error of the time to which we are alluding was the confusion in the medical mind on the subject of fever, so that the exhausting pyrexia due to absorption of toxins was regarded as "over-action" or *phlogiston*, to be reduced by a combination of lowering, depleting, and devitalising proceedings, which hurried most of the patients to their graves.

It is not to be wondered at that such therapeutics occasionally stirred the opposition of independent observers, and that in spite of professional fashion and prejudice more rational ideas prevailed here and there. As early as 1747 a doctor in the Highlands of Scotland addressed a printed letter to the profession in London, insisting on fresh air and diet as the essentials of successful treatment of phthisis, medicinal treatment being secondary and unimportant.

Andrew Stewart (father of the late Dr. A. P. Stewart, of Middlesex Hospital, who was the chief pioneer in distinguishing typhoid from typhus) studied theology, and was licensed as a preacher by the Presbytery of Edinburgh in 1796. He afterwards studied medicine, and became an M.D. He was presented to the parish of Erskine on the Clyde by the 10th Lord Blantyre, whose daughter he treated for consumption and married. Dr. Stewart inaugurated a method of treating consumptives by fresh air, mild exercise, driving or riding, a good but not excessive supply of digestible food, daily sponging the whole body with vinegar and water, and plunge baths or preferably the open sea. He met with much success. But when a paper descriptive of his method was read in 1825 at a medical society in Glasgow, the majority of members were hostile, declaring that almost every case of phthisis was accompanied in the early stages by inflammatory action, for which a distinctly anti-phlogistic plan of treatment was indicated. Dr. Stewart was referred to in the minutes as "a medico-clerical

gentleman of consumptive notoriety." His treatment became known as the "*beef-steak and porter treatment.*"

In a treatise on domestic medicine written in 1783 by Dr. William Buchan, he advocated pure country air and riding on horseback as most important, and milk he considered as of more value in this disease than the whole *materia medica.*

Nearly a century after the Highland physician sent his letter to his friends in London, Mr. George Bodington, of Sutton Coldfield, Warwickshire, published an "essay on the treatment and cure of pulmonary consumption on principles natural, rational and successful." It is refreshing to read this sensible little work, with its outspoken condemnation of the phlogistic theories and the ruinous practice of the time. Like all reformers, he had to endure the contemptuous criticisms of the "superior persons" of his day. He insisted that the nutrient, muscular and sanguiferous systems should be maintained in the highest perfection possible, and to this end that the patient should live as far as practicable in the open air, undeterred by the state of the weather, that he should have an amount of exercise suitable to his condition, and that he should have an ample and frequent supply of nourishing and digestible food. The following quotation reveals the reception accorded to his views:—

"Sir James Clark rather sarcastically alludes to what he terms the 'beef-steak and porter' system, which he decidedly condemns, apparently guided by the phlogistic theory. I could never recommend porter and beef-steaks to any person suffering from tubercular consumption, not from any preconceived notion of 'phlogiston,' but on account of its very grossness and unfitness for a consumptive patient. On the other hand, neither could I recommend to such an one from a prejudice in favour of the aforesaid theory of 'phlogiston' a meagre diet of vegetables, rice and water, aided by tartarised antimony, etc. I should recommend to one thus consuming away under the influence of this *wasting disease* a nutritious diet of mild fresh animal and farinaceous food, aided by the stimulus of a proper quantity of wine, having regard to the general state and condition of the patient. If this is to be called 'the beef-steak

and porter system,' then I am guilty of patronising it; but to my mind it rather has the character of a preservative system, whilst the wasting plan is as much entitled to be called the destructive one."

Again, referring to the inhalation of gases, he says: "The only gas fit for the lungs is the pure atmosphere freely administered without fear. Its privation is the most constant and frequent cause of the progress of the disease. . . . How little does the plan of shutting up the patient in close rooms accord with this simple and obvious principle! As to the result of such a practice, it is known to all: one-fifth of the deaths annually in England are from consumption, whilst cures are scarcely ever heard of and never expected. Despair seems to have taken full possession of the medical profession as regards this destructive disease."

Bodington was the real founder of the sanatorium system. He recommended that patients should live in a suitable house specially selected as to site and soil, and that they should be under the constant supervision of a medical man well fitted by training to adapt the treatment to each individual case. He also emphasised the importance of after-care, and of apparently cured persons avoiding city life and taking up such rural pursuits as gardening and the like. The book contained a record of more or less advanced cases greatly benefited and some seemingly cured.

The *Lancet* in 1840 reviewed the work, and its scepticism was outspoken.

Bodington was in advance of his age. His doctrines fell on ears deafened with prejudice, and it was not until nineteen years later, when Brehmer founded the great sanatorium at Görbersdorf, in Silesia, on principles identical with those of Bodington, that the sanatorium idea began to take root on English soil. A tardy honour to this reformer's memory was the republication in 1901—sixty-one years after its original issue—by the New Sydenham Society of his excellent little monograph.

In 1855 Dr. Henry MacCormac, of Belfast (father of the late

well-known surgeon, Sir William MacCormac) published an essay on consumption, in which he pressed on the profession his sanguine belief in the curability of the malady if properly treated. He was a convinced and strenuous fighter for fresh air, and had little patience with what he considered the groundless fear of "taking cold." He expressed himself with Celtic fervour on this subject.

MacCormac's was the usual reward of the innovator and the reformer. When in 1862 his views were brought before the Medico-Chirurgical Society of London, one member characterised the reading of the paper as a waste of time, another asked that the Society should be protected against the reading of such productions, and the customary vote of thanks was refused. But MacCormac was not discouraged, and to the end of his days pursued the campaign.

Mention may properly be made here of Dr. John Hughes Bennett, the distinguished physiologist and Professor of Clinical Medicine in Edinburgh, to whom we owe the introduction of cod-liver oil as an addition to the diet of the strumous. He paid peculiar attention to the digestive system of the consumptive, and believed that in them an excess of acidity existed in the alimentary canal, neutralising the alkaline secretions of the salivary and pancreatic glands; hence that carbonaceous and fatty metabolism was interfered with, and the patient consumed his own fat. Whether or not this theory accords to any large extent with proven facts, no one will deny that cod-liver oil is a valuable adjuvant to treatment. Hughes Bennett was sympathetic to the views of Dr. Stewart, of Erskine, and did not share the hopeless outlook usual in his day. His text-book of medicine in which these opinions are put forward appeared in 1859.

Sir Benjamin Ward Richardson in 1857 earnestly pleaded for the hygienic treatment of consumption.

In Germany, Hermann Brehmer, who had been influenced by Bodington's writings, started in 1854 a small sanatorium, and in 1859 founded the great institution already referred to at Görbersdorf. His assistant, Dr. Dettweiler, who had been

cured there, afterwards erected the famous sanatorium Falkenstein, in the Taunus mountains. His great desire was to see suitable sanatoria for the working-classes over Germany, and this was afterwards accomplished through the State Health Insurance Law, in imitation of which our present invalid insurance provision has been to a great extent modelled.

It was largely through personal acquaintance with Dr. Walther's private institute at Nordrach, near Biberach, on the part of British medical men that the sanatorium idea became familiar to English minds, and many Nordrachs are now accomplishing the same results on British soil that have been achieved in Germany.

In America the most brilliant work is associated with the enthusiastic Trudeau and his co-workers, Drs. Kinghorn, Lawrason Brown and Baldwin, at the Adirondack Cottage Sanatarium, Saranac Lake, whose reputation is world-wide.

There are at this moment some ninety special sanatoria and hospitals for tuberculous disease in this country, exclusive of workhouse infirmary wards set apart for this purpose, and very few people will be found to deny the extreme value of these institutions. The limitations of their usefulness are due (1) to their utter insufficiency in number to cope with more than a fraction of the diseased population, (2) to the fact that, save in only one or two instances, they have to exclude the very class that most urgently need their services, namely those who are too poor to pay anything for their maintenance, and (3) to their inability to keep the patients long enough under care for anything like actual arrest of the mischief. This, of course, refers to the charitable, and not to the private institutions. As we stand at present, the most important work of the sanatoria is not so much curative as educative.

Statistics of actual complete recovery in these institutions are extremely meagre, but all must admit the great improvement so often recorded and visibly demonstrated, and, above all, the hygienic habits inculcated on the inmates, and we must hope continued to a large extent at home after the patients' return. And while speaking of education, I would urge that

all school authorities without exception should require that children, both in primary and secondary schools, be taught as a compulsory subject the foundation truths of physiology, and especially the care of the teeth, the skin, and the alimentary tract. The steady decline in phthisis which has been taking place in our country since the year 1855, accentuated after the *Public Health Act* of 1875, again after the discovery of the tubercle bacillus in 1882, still more after the passing of the *Housing of the Working Classes Act* of 1890, and most of all after the establishment of sanatoria and the beginning of notification (about 1899), this decline will surely hasten more and more rapidly when public opinion is fully enlightened, when spitting in public places is a penal offence, and when the social conditions and the habits of the labouring classes have reached a higher level.

This is not the place to discuss the National Insurance Act of 1911, or the relation of the medical practitioner to its working; but this at least must be said, that the scheme for dealing with tuberculosis recommended in the Interim Report of the Departmental Committee, issued only a week or two ago, ought, if thoroughly carried out, to mark a great step forward towards the goal at which we all aim, the total extinction of the disease, and is at least the first attempt to deal with the problem on a national scale.

Before concluding my remarks on the history of treatment, I must allude to a subject much too large for more than a passing reference, but one of the greatest therapeutic importance. I mean the use of tuberculin in the treatment of pulmonary tuberculosis.

After Koch's rather premature introduction in 1891 of what is known as "old tuberculin" as an active immunising agent, and the unsatisfactory and even disastrous consequences that too often followed his dosage, the remedy fell into disrepute, and it was quite ten years before it began to be rehabilitated in the estimation of professional men, a process much stimulated by Sir A. Wright's discovery of opsonins and their measurement and his work on vaccines. Such workers, however,

as E. L. Trudeau, R. W. Philip, and many others had continued to study the subject, to try various preparations and methods of dosage, and to watch and record results.

Very diverse are the views of its efficacy among experts, but nearly all are agreed that though no true specific, it is in suitable cases a definite aid to curative treatment. A few go so far as to regard it as of more importance than all other factors of treatment, and "tuberculin dispensaries" for its systematic use already exist among us. This diversity of opinion is largely owing to the impossibility of standardising the remedy, to the facts that slight differences of manufacture or a few weeks of age markedly alter its potency, and that no decision has been generally reached as to which of the numerous preparations is the most reliable, while accurate statistics of its curative activity are *ipso facto* impossible of attainment. The expert workers, however, are very sanguine that before long better tests of its action and regulations of procedure may be formulated. When the opsonic index was first worked out for various toxins it was used as a guide in the administration of tuberculin. It is so no longer. The "intensive" method is now generally practised. A minimal dose—about the $\frac{1}{10000}$ or a little more of a milligram—of solid bacterial matter is first used, and is very gradually increased in doses repeated at intervals of two to five days until the earliest signs of reaction appear. The injection is now intermitted until the reaction has subsided, when slightly increased dosage at wider intervals is continued. Doses of 1, 2 or even 3 milligrams may ultimately be reached with the augmented toleration of the patient.

Trudeau is worth quoting here. He says: "The first impression which the physician receives who begins to make use of tuberculin is a most profound respect for the tremendous potency of this toxin. A toxic substance which in so infinitesimal a dose as the one five-thousandth of a milligram of the solid substance contained in Koch's bacillary emulsion may produce typical and marked constitutional disturbance in the tuberculous individual is certainly not to be used heedlessly and is potent for evil if carelessly administered. I would not

urge any physician who prizes his peace of mind to embark on the treatment of tuberculosis by this method unless he is prepared to begin with minute doses and increase with the utmost caution."

While Koch thought pronounced reactions were necessary to success in this form of immunisation, Trudeau holds strongly that fever reactions are not necessary for good results, and in fact should be strenuously avoided.

At the Royal National Hospital at Ventnor one milligram is the highest dose yet reached. Dr. Gilchrist, the senior resident medical officer there, informs me that on the whole the patients desire the treatment, and frequently express themselves as feeling better after the dose, *i.e.* after twenty-four hours have passed. Several men at Ventnor who are going through a course of graduated work have also been having tuberculin, and almost always have been able to go on with their work as soon as the temperature (with a febrile reaction) has returned to normal. At Winsley during 1911, we learn from Dr. Crossley's report, out of 269 patients admitted 42 were treated with tuberculin ; of these 19 did very well, 9 fairly well, 2 made no improvement, and in 12 the treatment could not be continued. The method of dosage was that already described.

Dr. Thurnam at Nordrach-on-Mendip uses tuberculin as a routine treatment in all suitable cases. He considers that each different preparation has a special efficacy for the different individual case, and has to be selected experimentally.

The bacillary emulsion, containing triturated bacilli with both endo- and exo-toxins, is the form of tuberculin now most generally used, and at Saranac is almost exclusively employed. But all tuberculins seem to depend for their potency on the same substance, and all act in the same way, immunity to one kind carrying immunity to others.

On the other hand, Dr. Marcus Paterson, as is well known, uses no tuberculin at all at Frimley, the great sanatorium connected with the Brompton Hospital, preferring the auto-inoculation method of supplying antigen to the blood by means of carefully-regulated exercise, and theoretically his position is perfectly logical.

As regards the selection of cases, all are agreed that early and afebrile ones are most hopeful; but, tuberculin or no tuberculin, these are the cases that always respond best to rational treatment. There is, however, an interesting consensus of opinion on another class of case which deserves to be mentioned.

Dr. Edward Squire, the well-known authority of the Mount Vernon honorary staff, writes to me: "Some patients after progressive improvement for some weeks or months under sanatorium treatment get to a stage where improvement stops; there they stick fast. In such cases tuberculin often helps them on."

In the *Johns Hopkins Hospital Bulletin* for August, 1909, Drs. Hamman and Wolman, reporting on their work with tuberculin at the Phipps Dispensary at Baltimore, write: "Perhaps the most striking improvement was attained in cases of a moderately or far advanced character which had remained stationary after experiencing some amelioration from general hygienic and dietetic treatment." Again, in a private letter from Dr. Kinghorn, of the Adirondack Cottage Sanatarium at Saranac, he says: "There are a group of cases which we see at the health resorts which have chronic lung tuberculosis. Their physical condition and the lung condition seem to change little or not at all from year to year. I have repeatedly been able to carry some of these cases to cure or arrest of the disease by tuberculin treatment."

The rationale of these facts seems clear enough. In so quiescent a condition too little toxin was produced by the organism to stimulate the defensive powers of the body cells, and a supply of toxin from without produced the requisite stimulus. This is not the place to refer to the use of tuberculin in other situations of infection—lymphatic glands, skin, genito-urinary system, joints, etc.—but in these there is no doubt a great field for this remedy.

I have now traced the treatment of phthisis from a century and a half ago to the present day. The outlook is full of hope. If we remember that the death-rate from phthisis in England and Wales, so far as statistics are available, has declined from 39.9

per 10,000 persons in 1838 to 11.5 in 1906, and that it dropped 14 per cent. from 1901 to 1909, and in London in the same period no less than 33 per cent., we may well hope that in two generations the "white scourge" will have become only a memory in this land, like typhus or leprosy.

Towards this end a national specific education is required; over-crowding must cease, and the most vigorous application of preventive measures must be adopted to stamp out bovine tuberculosis, to secure a pure milk supply, and to guard our shores from the incursion of phthisical persons from abroad.

SOME REMARKS ON INSANITY; ITS CLASSIFICATION AND NOMENCLATURE.

BY

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CLASSIFICATION is needed for the purpose of isolating diseases or disorders from each other where an independent existence can be determined. Although it is more difficult to draw sharp distinctions between forms of mental than of bodily disease, yet it is possible, from amongst the manifold symptoms of insanity, to isolate some naturally cohesive groupings without assuming that such syndromes are in themselves discrete entities.

Schemes of classification have been attempted for over half a century; the earlier ones necessarily largely metaphysical, then clinical, the later ones clinico-pathological. At first only leading divisions were made, with added variations recognised as modifications due to personal idiosyncrasy or environment. As acquaintance with the influences of hereditary predisposition, causation, epochs in development, physiological crises, increased, so the scope of classification was enlarged, and gradually an

extensive, perhaps rather artificial collection of supposed symptom-groups was arrived at. For practical purposes each of these would carry certain expectancies in course and outcome, in casual liabilities and treatment; but as the subdivisions increased it became evident that the complexity rather clouded than cleared the survey. In fact, any attempt at a too strict demarcation of forms of insanity must fail, for no two cases of mental disorder can exactly correspond. Each case is an entity expressing a specific reaction of the mind to some particular influence, and groups must vary as the individual cases. A certain aggregate of symptoms, too, may have any of various causes, or the same cause produce various symptoms. Again, some ruling disposition, such as suspicion or pride, may exist as a background in mild, acute or chronic insanity, giving, so to speak, an atmosphere in common to maladies of quite a distinct nature.

It must not be supposed that those responsible for elaborate schemes of causal or symptomatological kind have meant to create artificial varieties, but that their object has been to embrace many cases possessing certain common characteristics into collections, in each of which should be represented a leading cause, symptom or outlook giving a distinctive aspect. Thus such groups might be differentiated from others showing a similar type of reaction, but with another origin. Despite the greater knowledge of the modern school of psychiatry, the tendency of late has been to revert to broad groupings and to the elimination of merely symptomatic, diathetic and fanciful arrangements. At the same time, efforts have been made to combine various states seemingly independent, or, on the other hand, suffering from casual or false attachments. Very few conditions in insanity can fulfil the requirements of a typical disease in which there should be a reasonably constant relationship between the organic lesions and the symptoms. The variety of mental phenomena is great, the morbid expressions of them and the idiosyncrasies of individuals inexhaustible; thus, most insane conditions are disorders, and their peculiarities determined by varying causes or dispositions.

The earlier of the more recent schemes of classification comprised the vesanic or functional disorders, the diathetic and sympathetic, the toxic. Later on were added groups based on developmental and involutional influences, partial insanities, associated psychoses. At that time distinctions were not attempted between toxic states of internal or external origin. The recognition of the hereditary degenerative psychoses was a most important event, and into these were incorporated most of the existing monomanias.

A still further elaboration has resulted from greater knowledge of causation and ascertained pathological conditions. As for moral insanity, it may be elided from a modern classification as an entity; in its various phases it is included under the hereditary degeneracies as constitutional immorality, sexual perversions, etc. The true degeneracies, as partitioned from the constitutional tendency to the arousal on excitation of a latent psychoneurosis, imply a veritable decay of stock, a predestination to insanity. Such include the hallucinated deliria, hysteria, chronic neurasthenia with obsessions and impulses, hereditary intellectual weakness, dementia precox and paranoia (according to some authorities).

Before a satisfactory table of classification can be set forth, it is necessary to discuss more or less recent modifications or changes in nomenclature, as also the altered constitution of certain syndromes by limitation or extension, and by the incorporation or exclusion of other forms of disorder.

It is especially requisite to survey the group of mental disturbances formerly included under the title of Chronic Delusional Insanity, and now known in part as systematised delirium, in part as hereditarily degenerate insanity; in either case with or without the existence of hallucinations. Here will be found many of the old monomanias. We may at once premise that it is not yet possible to take some of these forms out of the region of debate, so far as the question of their individual independence is concerned, and we think too much segregation has been attempted; in reality, the forms overlap. It is of greater importance to comprehend the general characters

underlying these delusional disorders and their modifications than to seek an unfeasible separation into distinct disorders.

The main features in the isolation of certain forms from amongst the mass of delusional insanity may be briefly stated, They are the presence or absence of influential hallucinations, the regular or the episodic development of the malady and its delusions, the basis of growth, the presence or absence of an established order of symptoms in evolution, the number, interdependence, transience or stability of the delusions, and the existence or not of notable degeneracy in the person or family. Accordingly the establishment of two important groups has been essayed. Firstly, hereditarily degenerate forms, including insanity of unsystematised evolution with hallucinations (or the hallucinatory delirium of degenerates); this is sometimes, and questionably well, called paranoidal delirium; also systematised insanity without hallucinations, called by the French school "*délire de revendication*," or "mania of persecuted persecutors." Secondly, psychoses with congenital predisposition, but not with actual degeneracy evident; these are paranoia or interpretive insanity and Magnan's *délire chronique* with hallucinations. The essential in all these forms is the so-called paranoical diathesis, in which exists the nucleus of all kinds of delusional insanity, whether persecuted, revengeful, exalted or hypochondriacal in type. The variations are occasioned by the relative strength and quality of the morbid heredity, and to some extent by the exciting cause where this can be said to exist. Inasmuch as the condition indicates chronic mental disequilibrium by its obsessions, impulses, phobias, impotences, youthful outbreaks, rapid onset and advance, hurried variations in mood and preposterous ideas, hallucinations, quickly evolved exaltation and altered personality, it points to a preponderance of real degeneracy. In so far as the growth of the malady is slow, developing in a recognised course, with stable and connected delusions and with pseudo-hallucinations or without any hallucinations at all, with comparatively preserved lucidity and long-postponement of dementia, in so far may the disorder be viewed as the deferred

expression of an anomaly of development, a perversion rather than disintegration of personality, a constitutionally distorted but yet serial mode of thought.

Morbid heredity is regarded as the most influential factor in all these states, but between the extremes of true paranoia and the hallucinatory delirium of degenerates there are marked distinctions—the order of mind inherited and the mental attitude are opposed in many particulars. The characterising features of the degenerate psychoses are revealed even in the comparatively mild states of psychasthenia—vacillations, obsessions, struggles of desire with a restraining personality, a coercive invitation to actions of an irrelevant kind from the outside, a state of mental conflict pursued for vain ends. The self is undermined by internal dissension. In the more pronounced degree of insanity of degenerates these features are exaggerated into sudden storms of mood and conduct, hasty maturation or episodic progress of the malady, readily-evolved delirious ideas, sudden exaltation, a medley of delusions, rapid change in or dissolution of the personality. Hallucinations are responsible for adding confusion and impulsiveness to the mental state. In paranoia, although the primary false idea may be suddenly realised, development from it is slow, steady and durable, the conduct logically determined, the struggle waged with an antagonistic environment. The ego is eventually completely enthralled by the masterful conceptions, and acts with precision and vigour. The disposition is often calm, reflective, mystical, complex, patiently researchful, and the paranoiac seeks to alter his environment in conformity with his changed self and to enforce his views upon it. The degenerate is tempted to act by some fancied defect in his surroundings, needing urgent redress, often with a sense of personal slighting or wrong, and his reaction is marked by its haste, intemperate passion, and unbalanced reasoning. The paranoiac always shows a steady exalted egoism, but his pride is poisoned by distrust and the primitive mysticism and romanticism, essentials of his character, continually expose him to imaginary hostile influences. Notwithstanding this apparently emotional

atmosphere, the prominent anomaly is intellectual ; incorrigible misinterpretation occurs in certain lines of thought. Degenerative insanity is, on the contrary, a quasi-maniacal condition, a sensory delirium, manifested rather in turmoil of ideas and action than in the laborious weaving of fresh delusions.

The various transitional forms between the extreme members of the delusional group just described have not at present settled limitations and nomenclature. We think that the term paranoia should be restricted to the type above indicated, which develops with system, without ruling hallucinations, and in which restriction of mental life rather than dementia occurs ; that systematised insanity, which is based upon or largely influenced by hallucinations, is classically illustrated in Magnan's well-known syndrome, *délire chronique* ; that amongst the hereditarily degenerate forms we can recognise one of a relatively unsystematic evolution nurtured on hallucination, and which can be termed the hallucinatory delirium of degenerates, and also one more regularly developed, not dependent on hallucinations, and which is identifiable with the French *délire de revendication.*

It is evident that no hard and fast line can be drawn between these different forms ; modifications will be graduated in accordance with morbid predisposition and other factors, which in proportion to degree and kind prepare for the calm, logical and interpretive state, or for the more excitable, erratic, impulsive and hallucinated one. In all it is observable that grave mental reductions are implied by the fundamental ego-centricism ; but whilst in paranoia the personality remains coherent though altered, in the markedly degenerative insanities it suffers disintegration ; permeated by false relations and erroneous conclusions, it is transformed and dominated by them. The extent of the morbid egoism, or again, the dissolution of the self when recognisable, is the best estimate of the relative seriousness of each form as met with, together with the partial or general limitations apparent in the intellectual sphere and the dissociation in thought. The more impaired the relation between subjective and objective consciousness and that of intra-psychic

states, the more obtrusive become the derangements of cœnesthesis and the dominating egoism; so also results the destructive rather than the constructive type of the new personality or main delusive concept.

Just as several differing states have been collected under paranoical psychoses, so under the term dementia precox a grouping of apparently varied conditions has been attempted. No psychosis has received more attention and criticism, and though as a term it is freely adopted at the present, there is far from being agreement as to its significance and limitations. It is an example of the difficulties that attend the enforced separation of a definite disorder from the multiple states which result from the diverse factors of hereditary taint, environment, epoch of life, acquired habits and intercurrent ailments. Let it not be thought that there is any wholly novel disorder here established; most of the phases were familiar to acute observers, from Griesinger onwards. The synthesis of several apparently independent disturbances of mind into one all-embracing, though exceedingly complex syndrome, is however the work of Kraepelin. It remains to be seen whether his labours have been exerted to a clear and persistent end. This author and his followers would gather into dementia precox all the old adolescent insanities, all the maniacal and melancholic attacks separable from manic-depressive insanity, most of the stupors and catatonic states. The English acceptation of the title simply implies the almost inevitable result, and not the elaborate symptomatology that precedes. There are many phases in the disorder, but it more especially represents those cases of insanity arising at the adolescent period which from marked degenerative tendencies, prolonged physical drain, mental exhaustion, or moral depravation of masturbatic habits, break down gravely and quickly. But here let it be said that it is unjustifiable to include all outbreaks at the adolescent period as inevitable dementia precox; there are many cases of mania or melancholia that recover at this time, and which may be viewed as isolated attacks in a predisposed person, or the first of a periodic and recoverable series. In any case, however, the mental

disorder possesses the features of extravagant, boastful, puerile, inconsequent conduct, or agitated and impulsive melancholia, with more or less confusion and often a background of suspicion. These states, in the more strongly hereditary cases, often pass into stupor with but partial recovery, or into dementia. All cases of stupor at adolescence, again, must not be assumed a phase of dementia precox, inasmuch as some forms following on acute emotional or confusional disorders of other kind are recoverable. In these there is an emotional background, inferential at the time and often revealed later, which is foreign to the apathy of dementia precox. In such status attonitus consciousness is not wholly in abeyance, more or less coherent delusions and hallucinations may be present, prompting negative resistance. The condition is rather a suspension than an abolition of intelligence and active expression—one analogous to the hypnotic lethargy, and frequently to be traced to mental shock, exhaustion or toxæmia.

Another phase of dementia precox, although less typical, is one of simple lethargy. It was of this doubtless that Griesinger wrote as follows (though without making any separation from the group of primary dementias): "There are states where the perversion of affections and apathy appear the chief elements . . . . a state mainly acquired by onanists and drunkards." Now and then will be found an adolescent of seemingly average intelligence who has passed into a purely apathetic condition, careless as to his present state and future career, indifferent to his family, yet excepting a certain mild hypochondriacal self-absorption, without other manifest change. The habit of self-abuse or excess in alcohol is by no means invariably traceable. This passive form is at the best only partially recoverable; notable gaps in intelligence, permanent feebleness of will, or unstable and freakish conduct will remain. Such cases no doubt were formerly grouped under primary dementia, and their salient features—gradual mental extinction with marked emotional apathy—were aptly enough so termed.

Taking dementia precox as a whole, the most characteristic qualities are the sectional intellectual deterioration and

emotional lethargy. The defect appears less of perception and memory than of serial and relative thought. Although there is a general mental enfeeblement, it is the discontinuity, the irregularity, the inchoate character of the intellectual operations that is the striking feature. As paranoia has been described as representative of a reversion to the mental traits of a primitive race, so precocious dementia, in its hebephrenic stage especially, is a return towards what Bevan Lewis has described as " the excito-motor irritability of infancy, with its jerky, spasmodic, ill-directed movements wanting in object, in power, in co-ordination, in skill." The behaviour of these cases is marked by its haphazard, irresponsible, flighty or reflex nature ; in such there would seem to be a hazy familiarity with the complex environment and a child-like inability for immediate adjustment to this. The association system, perhaps imperfectly evolved or organised, appears at fault, and this intra-psychic severance confers the aspect of discontinuity and inappositeness which is characteristic. There is also observable the divorce of will from reason ; motives to action seem as the stray promptings of a low delirium ; conduct in relation to environment is often the height of inappropriativeness in reaction ; hence results negativism, mutism or blind impulse. Reduced at times to an almost purely automatic level, the patient's behaviour when excited is monkey-like, embracing mimicries of words or gestures, antics, stereotyped and senseless performances, purposeless destructiveness. Circumstances are only known to them to be misconstrued or resisted. In the milder forms the same characters are perceptible—perversions of mood and conduct, waywardness, inconsequent or bizarre behaviour, suspiciousness, vague hypochondriacism, and the utterance of crude, silly or disconnected statements. In most other forms of mental decay there is some recognition of anomalous thought and conduct by the patient himself, but in dementia precox the person seems unconscious of or indifferent to the change, and his behaviour only expresses the aggravated puerility and self-satisfaction which indicates the serious impairment of consciousness. The stolidity and emotional indifference with

a low suspicion are also opposed to the energies, the assertive and acquisitive tendencies of the normal adolescent male, or to the reflectiveness and sensitive receptivity of the female.

Many of the states already described, which include inertia, stereotypism, immovability, negative resistance have been formerly grouped as katatonia ; this last has been merged into dementia precox. Now to this already complex syndrome Kraepelin has proposed the addition of yet another group, that is unsystematised insanity of degenerative kind with or without hallucinations, but of course ending early in dementia. Cases, then, of dementia precox which do not become arrested or pursue a course of mere fatuity, but which behave as chronic mania with fragmentary delusions and hallucinations, would be classed as the paranoidal demented ; the delusions unsystematised, the hallucinations erratic, the conduct disorganised. Why such condition, whether part of precocious dementia or not, should have received the title of dementia paranoides is not evident ; the essential character of paranoia or interpretive insanity is the absence of confusing hallucinations and unsystematised delusions. It is a disorder particularly methodical, slow, logical, with an unalterable bias in many if not all of the patient's intellectual operations. Prognosis where premature dementia is suspected is of high importance, for a positive forecast is one of appalling moment. There has to be borne in mind the possibility of occasional and recoverable attacks of acute confusion ; of a primary attack of recurrent mania or melancholia with stupor-katatonia ; of youthful progressive paralysis ; of alcoholic delirium or episodic excitement and confusion in degenerate persons ; transient persecutory or ambitious ideas in the congenitally feeble-minded. There is little doubt as to the strong inherited neurotic taint in dementia precox ; but whilst some claim that dementia precox is most typical when occurring in young adults of average intelligence, others would have it to be grafted, not seldom, on a mild congenital weakness. A certain proportion would probably belong to the class of inborn moral defect, especially complicated by masturbation, and brought into active prominence at

adolescence. Bevan Lewis, writing of such cases, remarks: "Prior to the mental commotion at this epoch, these moral imbeciles have, it may be, shown an aptitude for learning, a brightness of intelligence proportionate to their age." Lewis regarded the stuporose, depressed and hallucinatory forms of adolescent insanity as particularly involved with masturbation. Owing to certain resemblances to the acute confusional psychoses, it has been suggested that dementia precox is nearly allied to them, and Kraepelin has theorised as to its dependence on a sexually-evolved auto-toxine, apart from the essential intrinsic predisposition. In such very predisposed persons the nerve-cells are highly sensitive to all prejudicial influences. When the enormous changes produced throughout the whole system by the elaboration or deprivation of the sexual function are considered, it certainly seems possible that the more susceptible of the nervous structures in degenerate persons are unable to withstand the intense stimulus of the sexual evolution. This may correspond with some special auto-toxine cast into the circulation (as proposed by Kraepelin) of the nature of a cyto-lysin, producing violent tumult and eventual extinction of function. In other forms of dementia precox it would appear that there is a failure of sufficient energy to continue the development of the individual brain, or even to maintain the level reached. In such cases, too, it cannot be said that the nervous system has succumbed to the stress of combating a hostile environment, but rather that disequilibrium and decay have occurred from inherent weakness of organisation, the nerve-cells and tracts involved simply fading, passing-out of circuit and being replaced by connective tissue. Partly, also, the lack of resistance and active function allows injurious effects to arise from imperfect metabolism and accumulation of waste products around the nerve-cells.

It has always been unfortunate that the literal translation of the German title has been adopted in England instead of a synonym expressing the true German meaning. Kraepelin's syndrome does not fit the nomenclature in its strict English sense, although it is applicable to certain cases such as several

English psychiatrists have described under the head of adolescent insanity and primary dementia. And personally we prefer to keep it restricted to the latter and some irrecoverable cases of the former.

Another important established disorder is amentia or confusional insanity. This now embraces many of the maniacal and agitated melancholic cases formerly classed as delirious; many puerperal cases, acute delirious outbreaks in the degenerate as well as certain partial stupors. It was first separated as a syndrome under the title of Meynert's amentia. In its modern acceptation it comprises the infectious, toxic and exhaustion psychoses. Thus there belong to this category many of the disorders of pregnancy, puerperium and lactation, uræmic deliirum, deliria following on infectious fevers, acute rheumatism, pneumonia, gastro-intestinal toxæmias. It is not, of course, to be assumed that all cases of insanity occurring with puerperal conditions or lactation are necessarily of confusional nature; the aspect will be modified by the relative strength of predisponent and excitant cause, or its genuine toxic origin. There belong, in addition, to amentia states of mental perturbation and confusion resulting from acute or prolonged physical fatigue or primary psychic exhaustion occasioned by some protracted conflict with painful, incessant ideas or delusions. The purely endo- and exo-toxic forms show evidence of a general affection of the peripheral nervous system and the bodily organic functions.

Confusional insanity is not determined by age, and only inconstantly by notable inherited neurosis; patients are often of average or good mental development. Where, however, it appears as the result of hereditary influence the psychoses investigated in the family history are most often found to have been of the same nature, this being largely so because the main exciting causes, pregnancy, puerperium and lactation are peculiar to women, who furnish the larger proportion of confusional cases. Although prodromata are usually apparent, the malady in its grave form is often fulminating and the reduction in consciousness deep. Like the so-called hebe-

phrenic-catatonic stage in dementia precox, there is intense dissociation of faculties, hallucinations and volitional abandonment. There is perception but not realisation of the environment, inferences are confused, there is distressed bewilderment. All mental operations are hesitant or interrupted, even perhaps to the extent of word-mutilation. The strange phantasmagoric world in which the patients dwell inspires them with terror and uncertainty. There is not, however, the wholly irrational resistance, the grotesque gestures and antics, disconnected utterances and attitudinising of the precocious dement; the aspect, though variable, is mainly in conformity with the emotional mood. In milder cases, where inertia and passivity are the main features, the mind of the patient can be observed groping painfully for its appropriate expression, and its attitude, if simple and child-like, is not bizarre or ridiculous. Association of ideas is slow, interrupted; chance annexations are formed. Speech is disjointed, there is neither the rapid casual observation and superficial incoherence of the acute maniac, nor the automatic, spasmodic and wholly unrelational utterances of the precocious dement. With the maniac there is an acute though momentary appreciation of the environment; but such limited and shifting attention as is possible to the ament is concentrated on his interpretations of the confused surroundings. The extravagances of the acute delirious form of confusional insanity are largely due to the insistent but continually varying hallucinations of all senses. Partly from mental exhaustion, in part from physical conditions, there is grave risk of collapse. The contrary state of passivity may be ascribed to the inability to determine any act, or to a real stupor, and this latter is doubtless most serious as indicating a profound poisoning or exhaustion. Yet it may, as a narcotic condition, allow rest and a chance of recuperation. A stupor which is conjoined with negativism, interrupted by automatism and senseless acts, outbursts of laughter, suggestibility, etc., will draw attention to the possibility of dementia precox.

Serious as are the general malaise, denutrition, the futile irritability causing insomnia, and the gastro-intestinal troubles

in confusional insanity, there is an even worse outlook as regards recovery in the maintenance or speedy return of apparent bodily health and normal functions without mental improvement. Thus the persistence of menstruation and sustained body-weight, with the progress of an acute amentia, must constitute a grave omen. As a whole amentia is a recoverable form, and not likely to recur, but its most delirious forms are excessively fatal. Owing to the grave reductions in consciousness, the evident intra-psychic dissociation, the sudden onset, the bodily involvement, amentia has, with some justice, been regarded as appropriately classed as a toxic psychosis. The hallucinatory and dissociated mental state has been ascribed by Stoddart to increased synaptic resistance, severance of peripheral and central perception corresponding to that of peripheral from central neurons.

Melancholia and mania, primary forms in the earlier classifications, have been variously elaborated and then distributed. Allotments have been made to the credit of dementia precox, confusional insanity, folie circulaire, recurrent insanity, and thus the original comprehensive grouping has been split up. Eliminating the first two of these, a redistribution of the rest has been proposed by certain psychiatrists, and a syndrome formed which covers all kinds of mania and melancholia, except an involution psychosis (melancholia at the climacteric). Thus it is suggested that one condition or diathesis, the "manic depressive," should embrace the whole range of the affective insanities. Such a diathesis is assumable, but it is not agreed that attacks of pure mania and melancholia may not occasionally happen which are not repeated, or rarely so, and which are not merely stages of dementia precox. Nor, again, is it wholly acceptable that recurrent mania or melancholia, periodic and otherwise, have not an independent existence rather than being merely an exclusively prominent phase in a duplex mental state. Whilst there are many suggestions of one diathesis underlying the whole of the affective maladies, yet it is an extreme position to exclude either acute isolated or recurrent mania and melancholia as sufficiently separate entities. In

marked examples the conditions are antithetic clinically and psychologically, notwithstanding the differences may be of degree only. What it is important to recognise is the constitutional or intrinsic character of some of these states in comparison with the relatively accidental or extrinsic nature of others. There are here many grades. In the case of pure mania isolated attacks are undoubtedly infrequent, and evidence of a sufficing extrinsic cause exceptional. Hence whether the attacks be single or repeated, some constitutional predisposition may be inferred as a rule, although the influence of exposure to recurrent causes, like or unlike, but at any rate adequate, must receive attention.

Melancholia is in somewhat different case; it is more prone to isolated appearance, less to repeated attacks of short duration, and it is certainly more influenced by extrinsic causes, and more apt to develop in a disposition naturally in accord than is the case with mania. We may view the isolated attacks of these effective conditions as a mere lapse from the normal, occasioned perhaps by some toxin exogenic as regards the brain, or at any rate by some cause exercising unusual influence, possibly through the medium of the circulation. In the recurrent form the intervals are completely or nearly lucid, the onset of the psychosis is at a mature adult age, there is no evidence of degenerative stigmata, or of an obviously morbid disposition.

The existence of a manic-depressive psychosis has been inferred from the frequent occurrence of a melancholic stadium before an outburst of mania, from the alternations in circular insanity, or the stray appearance of opposite emotional phases in the course of a recurrent disorder; also from the known oscillations in feeling, diurnal, menstrual, sexual, recognised in exaggerated form in the insane. Griesinger alluded to the rebound of mood after melancholia or vice versa, and assumed that mania corresponded to a deeper-seated mental disorder, and Bevan Lewis has laid stress on the difference between mania and melancholia, as being one of degree in the relative reduction in consciousness, the failure in object—and rise in

subject—consciousness constituting a common basis. Nevertheless, both from a psychological and clinical aspect there is abundant reason to admit the discrete existence of the two forms of affective disorder, although they may be but stages of the same process dependent on some common but fluctuating condition. The distinctions between typical cases are pointed out by Lewis. In the maniac, buoyant, inconsequent thought, "overaction on lower planes in the intellectual sphere," giving untrammelled freedom and exaltation in feeling. In the melancholic, overaction in the afferent, impressive sphere, with co-existent inertia in the intellectual and expressive one, feeling pent-up and struggling. The rise in subject consciousness which is common to both determines in depression or elation according to the sphere of disorder, and the obstruction or freedom in intellectual operations. In the melancholic painful thought and restricted activity predominate, intensity, persistence and sluggishness prevail; in the maniacal rapidity, transience and turmoil of thought characterise. The former realises sadly his limitations and disabilities, the latter exults in his imagined emancipation. In either case the real intellectual liberty of the sufferer is impaired or lost.

As already stated, some of the old subdivisions of the affective disorders have been distributed amongst fresh syndromes: the agitated forms to confusional, toxic or exhaustive psychoses; the anergic or inhibitory to dementia precox, or the hereditary degenerate class; the senile to involutional decay. The simple form, purely emotional without confusion, and with mere slow and restricted thought, active despondency and ideas of unworthiness, alone remains as a pure variety with some writers. The same deductions and allotments are made in mania. All varieties are probably but different stages or depths of involvement in the same disorder, although perhaps occasioned by distinct causes. An advance towards the recognition of "manic-depressive" psychosis is afforded by recurrent insanity, or repeated, isolated and short attacks, not relapses, with lucid intervals. Its subjects are adults and predisposed, but not degenerate persons; there are

often excitant causes, but these are not essential. It is a form in which neurotic heredity shows itself in frequent lapses from stability rather than serious breakdowns, and in which each attack has an isolated character. Although each disorder, melancholic or maniacal, tends to reappear in its own mood, yet interruptions by or transitions to one of opposite kind may occur. Thus is reached gradually the circular psychosis which is the prominent illustration and argument for manic-depressive insanity. It implies not only frequent recurrence of the disorder, but oscillations, in some cases regular, between a high and low level of intellectual involvement. The varieties of folie circulaire, to use the old term, whether double form or serial, are regarded by some as only exaggerated phases of very usual pulsations or " tidal changes," occurring with a certain regularity in the course of any case. Griesinger and other distinguished observers of his time recognised the cyclical form, although it was not separately classified by them. There is indeed no question as to the existence of alternating phases in this condition of mental instability, but with the exception of a comparatively few typical cases, there is irregularity in the order of their occurrence, their relative importance and their periodicity. What one observer would call merely the rebound from a pronounced mania, another might consider the inseparable though minor phase of a circular disorder ; what by one would be considered only the irregularities of continuous instability of insane mood, by a second would be classified as folie circulaire without intermission. The influence of hereditary neuroses in this disorder, and the onset at early adult life, is notable ; co-fraternal heredity is thrice as often met with as in other forms of insanity, and there is observable a strong similar heredity in parents and children. It is, in fact, a state of persistent mental instability, in which certain periodicities common in the insane are emphasised : youth and strong predisposition being here combined, the alternations of mood are more frequent and marked, also more variable in their relationship. In many instances it will be found difficult or impossible to separate the cases as circular insanity from the

preponderating variations in form and mood which are found in the history of the chronic insane. Manic-depressive psychosis, however, does not so much imply an oscillation between two extremes as an indissoluble interdependence. The plea for it is this latent uniformity, not the patent manifestation of the double phase ; in other words, the disposition, not the display. Let it not be imagined that any new psychosis has been discovered, nor that the melancholic and maniacal aspects are as co-equal as the title would express.

In some psychoses the accidental factor appears to have a relatively strong causal influence, and the more the postponement of a primary or isolated attack of insanity towards the period of natural involution the more is an extrinsic agent to be inferred. Disorders of mind referable to traumatism, to coarse brain lesions either infantile and independent of cerebral development or of later acquisition, to toxic states, such as alcoholism, syphilis, uræmia, with perhaps secondary toxæmias from perverted metabolism—all these are naturally to be ranged at the opposite end of the causation table to those psychopathies which originate in the faulty mental constitution of the patient. The evident importance of many extrinsic factors has stimulated investigation into the somatic states in insanity. Thus, taking Kraepelin's syndrome, dementia precox, we find records of cytological changes in blood and cerebrospinal fluid, destruction of nucleo-proteids in cerebral tissues, diminution of neutral sulphur, indicating lessened cell-activity and oxidation, imperfections in circulatory system, etc., findings often contested no doubt, but showing the range of research pursued in this and other forms of mental disorder. There is, too, a steady accumulation of valuable and reliable histological data.

More progress has been made in the nature of general paralysis than of any other disorders. Although it cannot be said with assurance that general paralysis is impossible without syphilis, there is no doubt as to the paramount influence of the latter. It is well recognised that there is a distinction between syphilitic dementia with its accompanying lesions and the

meta-syphilitic conditions in general paralysis (to use the only practicable term at present). The connecting-link between tertiary syphilis and general paralysis is therefore not yet found. Clinically, it may be said that brain syphilis affords symptoms more erratic and episodic than in general paralysis and of a certain pathognomonic kind, such as severe nocturnal headache, insomnia, paralysis of cranial nerves, mono- hemi- or para-plegias, clonus, Babinski's reflex, amnesia, aphasia, etc., and especially complete iridoplegia. The invariable presence of tender spots found on skull-pressure in cortical syphilis is avowed to be absent in general paralysis. In syphilitics there appears to be less change in character and extinction of personality, more realisation of the mental transformation. Nevertheless, despite subtleties of diagnosis, it will be sometimes hazardous to differentiate between cases of syphilitic insanity, alcoholic insanity, and general paralysis, so far as clinical symptoms are to be relied upon. The presence of a positive Wassermann reaction in the serum merely proves the existence of syphilis, whilst, again a negative reaction in the cerebro-spinal fluid, even with some leucocytosis, only indicates that as yet nervous complications are absent, or if present, are of the nature of a gummatous meningitis. A negative reaction in both cerebro-spinal fluid and serum, again, has been obtained by accurate observers in undoubted general paralysis. But two facts are prominent as regards the relation of the Wassermann reaction to general paralysis. It is rarely met with in insane cases other than general paralysis (excluding those giving evidence of syphilis), and a positive reaction in serum and cerebro-spinal fluid repeated more than once is almost certain evidence of general paralysis. An increased globulin and protein content in cerebro-spinal fluid is found with both syphilis and meta-syphilis, as also lymphocytosis, but the difference in relative amounts is conspicuous.

There may be factors other than syphilis which are capable of producing cortical lesions of similar kind and distribution to those occurring in general paralysis, and hence symptoms in accord. These too, though far less frequently, may lead to an

altered metabolism, or the formation of an auto-toxin, which can disturb the functions of the brain cells. It has been theorised that the cortex cells in general paralysis in their attempts to neutralise antigen and in the production to excess of antibody, exhaust themselves and become absorbed. They are destroyed, as it were, in their defensive efforts to supply a surplus of antibodies.

When we regard the part played by other presumed toxic causes in insanity we are upon uncertain ground. The deliria of infective fevers, of certain poisons—alcoholic, alkaloidal, organic, auto-toxic, etc.—have suggested certain extended possibilities in somatic origins. The only condition of actual insanity, however, which is really comparable to the delirium of the infectious fevers, is that of acute amentia or delirious mania. Even this is inferred, but not yet proven to be due to a toxæmia. Less marked conditions can so far only be placed vaguely to the account of a perverted metabolism. A confirmation of the theory of toxæmia has been suggested by the leucocytosis met with in acute phases of mania and melancholia or in exacerbations during their course, also by a relative increase in the neutrophiles. Such are regarded as signs of a reactive protection like to that occurring in abscess, furunculosis, pneumonia, etc. Whilst, again, the marked remissions, even in long-standing cases, which have been caused by chance infections, are perhaps associated with a hyper-leucocytosis, so, on the contrary, the absence of leucocytosis, even leucopenia and diminished neutrophiler percentage, has allowed the inference that toxæmia has prevailed over resistance and an unfavourable forecast in regard to a demential ending to be made. At present there is no settled opinion as to the part played by organisms found in the tissues of the insane; but most observers consider their presence as casual, or as ante-mortem invasions; at most they may contribute secondary symptoms. It is seldom in any case that organisms themselves are found in or near the nerve-cells.

That the opsonic indices of blood in the insane are generally lowered slightly, though notably in the acute forms, does not

infer more than a lowered resistance perhaps, but not of necessity, directly related to mental disorder. Many other investigations might be mentioned, but it is here unnecessary to do more than show the attempts being made to place insanity on the same level as other disorders. Even so far, in addition to the recognition of the part played by hereditary predisposition and actual degeneration, that of the causal influence of presumed toxic and infective factors, of traumatism, gross lesions and so forth has immensely improved schemes of classification by giving relative weight to the internal and external agents bearing on the production of insanity. This balance must always have considerable value in forming a prognosis. Consequently the best classification must be based on causation; at one end of the table being placed those conditions in which predisposition seems to have least influence and causes external to the brain the most, and at the other end those states in which there is most constitutional proclivity to psychopathy, and accidental causes are of slight or no contributory value.

Such cases as might fall within the first group would comprise the cerebral lesions of infant or adult life not dependent on any developmental fault, but due to injuries, infections, arterial diseases, hemorrhage, etc., where the external cause seemed to be solely or mainly operative. A group in which there is a varying influence of accidental and constitutional causes will be formed by the so-called toxic and infectious maladies, amongst which are alcoholism, syphilis, thyroidism, influenza, metabolic perversions, and so on. In all these a certain predisposition is required for the production of the more definite psychoses, although states of confusion, delirium and dementia may be induced apart from this. Of the affective disorders, the occurrence of which in pure isolated attacks will be rare, melancholia, more elicited by external causes, may be placed at one end of the group, and mania, for which an extensive cause is uncommon and a constitutional one likely, at the other end. Possibly in persons of active imagination, great sensitiveness and finely-balanced faculties, these attacks may be produced as a result of shock, prolonged

mental or bodily strain, of severe self-repression, over-excitement or reaction from deep grief, apart from any discoverable predisposition.

In the sparsely recurrent or relapsing attacks of affective insanity, constitutional tendency becomes more definitely the important factor, but there may yet be found a determining influence external to the brain or to the person; but the frequently recurrent form, alternating, irregular, or repeating, indicates a special excitability and inherent defect of brain, a state of persistent mental instability, in which the need for an extrinsic cause is scarcely obvious.

Following these are the involutional psychoses, in which the mental disorder coincides with the decay of sexual life, or with anticipated senile changes, associated or not with some influential somatic condition.

The adolescent insanities, including dementia precox, approach the class of developmental defectives, inasmuch as the actual breakdown, or even the supposed contributory cause, is the result of the evolutionary anomaly. The serious disintegration of mind, acute progress, co-existence in other members of the family, and frequent irrecoverability, place the whole group in the category of those predestined to insanity Whilst some members of this are said to recover permanently, most of the less unfavourable cases will remain in the relapsing or persistently unstable class. We cannot, however, entirely eliminate some added toxic agent, or an undue susceptibility to toxins not necessarily abnormal in themselves. Almost last amongst the insane states are the true degenerative diatheses, persistent and irremediable, upon which acute or chronic deliria may be grafted, and which may include constitutional immorality, sexual perversions, congenital weakness, states of defective control, general neurasthenia and hysteria. This group, whilst showing congenital and irreparable vices of organisation, is in part not prone to any precocious demential ending, in part so far as the engrafted delirious forms are concerned, so notably prone.

Finally the class of arrested developments from inherent

causes is reached. Thus briefly and imperfectly is outlined the principle underlying a classification, which in its plan promises to endure, the placing of the particular disorder being but a matter of the knowledge of its nature, origin, and relation to other mental conditions already having a defined position in the scale.

THE RIGHT AND THE WRONG SIDE OF THE X-RAY PICTURE; HAS A MISTAKE BEEN MADE?[1]

BY

W. COTTON, M.A., M.D.

A FLUORESCENT screen can be viewed practically only from the side remote from the focus tube in action, while the plate and even the print as a rule are transparent enough to be viewed at any other time from either side. The right side of any picture made by rays diverging from a point is the side towards which lies the correct station point of the observer's eye, otherwise known as the centre of projection. It is the only point from which, looking towards the object, it is possible to see all the parts of the picture of an object in the same directions and under the same angles as the corresponding parts in the object itself would subtend to the eye if the object were visible, point for point. The wrong side of any such picture made by radial projection is the side remote from the centre of projection, from no point towards which side can an eye ever see the object and its picture thus wholly in line, or as it is called "in perspective." It is the aim of the present paper to prove by example and experiment—so far as experiments on the drawing-board can be regarded as such—that the original station point of the X-ray centre of emission of the focus tube (in regard to the object depicted, and the X-ray picture thereof at the time of exposure) is the only correct station point of the interpreter's eye, when he seeks

[1] Read to the Röntgen Society of London, January 2nd, 1912.

to gather the greatest possible amount of reliable information from any given single X-ray picture. I hope also by the way to demonstrate some of the more immediate practical consequences of a highly paradoxical thesis, to which, since I first suggested it early in 1901, I have been unable, so far as I know, to win one single medical convert.[1]

In photography the centre of projection lies between the object to be taken and the picture plane; in radiography and ordinary shadow projection from a near point the object lies between the picture plane and the centre of projection, while in ordinary drawing the picture plane is actually or mentally kept between the centre of projection and the object to be drawn. Practically as the case may be, the centre of projection is the optical centre of the camera lenses or the pinhole of a pinhole camera, or it is the X-ray centre of emission of the focus tube, or a small luminous flame, and in the case of an ordinary drawing it is the optical centre of the draughtsman's refractive media of one or other eye, the eye itself being a small camera.

When the picture plane (as in ordinary drawing) is between the object and the centre of projection, it may be conveniently spoken of as a graphic plane, the image being smaller than the object as a rule. In the case of radiography or ordinary shadow projection we may speak of the picture plane on the far side of the object from the centre of projection as a diagraphic plane, the shadow image thereon being larger than any corresponding parallel linear dimension in the object, except where the object comes in contact with the picture plane: there the image and object are of equal extent. A photographic plane may be erected anywhere, even virtually through the object to be taken, and may be of any size in relation to the object to be taken from the microscopic photograph of the planet Mars in the head of a breastpin, to the enlarged lantern slide projected on a white sheet of the photomicrograph of a cheese mite. Thus by photographic means we may enlarge the image on a graphic to one on a diagraphic plane, or we may similarly reduce the image on a diagraphic plane to any suitable graphic plane, say

to lantern slide size. But the terms graphic and diagraphic are useful ones as long as we remember that a diagraphic plane ls a plane of photographic enlargement ; while a graphic plane is one of photographic diminution ; some day no radiographic laboratory will be considered complete without a reduction camera. It is perhaps as well to mention here that in the case of any given object the various planes are supposed to be parallel to each other ; and in the course of picture making the centre of projection, whatever it may be, is kept steady in the same position in regard to the object.

In Diagram I, PD is part of the face of an X-ray photographic plate with film towards O according to the prevailing practice, or the back of an X-ray fluorescent screen or of an X-ray print

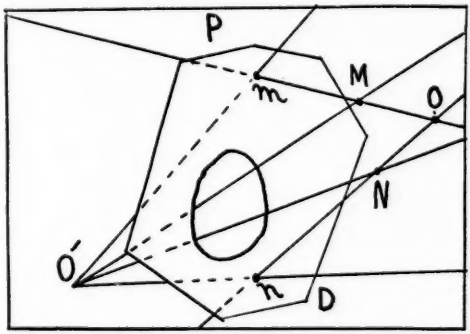

DIAGRAM I.

supposed semi-transparent ; O is the original station point of the X-ray centre of emission in regard to object and to PD. M and N are any two points of an object nearer PD than O and not in contact with PD ; and m and n form the X-ray projection or shadow-image of M and N on PD. O′ is the station point of an observer's eye on what I call the wrong side of the X-ray picture plane, namely on the side remote from the X-ray centre of emission O. At O′ the shadow on the face of the fluorescent screen (or visible from the glass side of the X-ray photographic plate or on the face or film side of the X-ray print) m n is visible in different directions from what the

corresponding points in the object M and N would appear in, namely in directions O'm and O'M, and O'N and O'n. To facilitate vision of the objects M and N there is represented an oval window in the semi-transparent plane PD. The observer may look from where he pleases on either side of PD, but until he places his eye at O looking towards PD he can never see either simultaneously or in succession m in the same direction or under the same angle mON as M appears in, nor n in the same direction or under the same angle nOM as N appears in. Now as the two straight lines OMm and ONn intersect only at one point O, O is the only point at which the observer's eye will see the object and its image in perspective. But O is the original station point of the X-ray centre of emission, therefore the original station point of the X-ray centre of emission of the focus tube (in regard to the object depicted, and the X-ray picture thereof at the time of exposure) is the only correct station point of the interpreter's eye. Q.E.D.

Owing to the essential ambiguity as to near and far of all shadow projection—so that the picturesque effect of the same in the case of objects whose internal structure is unknown is highly fallacious—a correct determination of the true *direction* in the object of the parts depicted is, perhaps, the main function of an X-ray picture (Diagram II).[2]

In the top figure the focus tube is shown in action with the centre of its target at the O of the last diagram ; on the far side of the fluorescent screen is shown an observer with his eye at a likely point, namely a point diametrically opposite the centre of projection, and at an equal distance from the picture, at what is called the corresponding station point to the picture plane. In this figure, and in the next below, it is evident that none of the seven points of the object will be seen on the face of the screen in the same direction as they would appear under in the object if visible from the corresponding station point, except one point that happens to lie in contact with the screen, and another which happens to lie in the axis joining the original station point with the corresponding station point. In the second figure the observer on the left of the diagram is contemplating

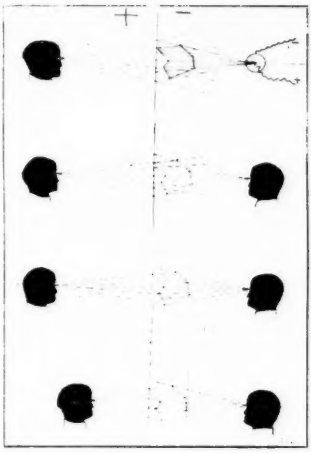

Diagram II.

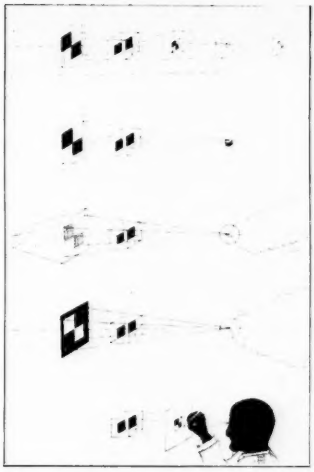

Diagram III.

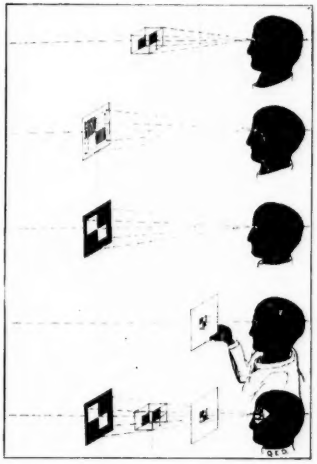

Diagram IV.

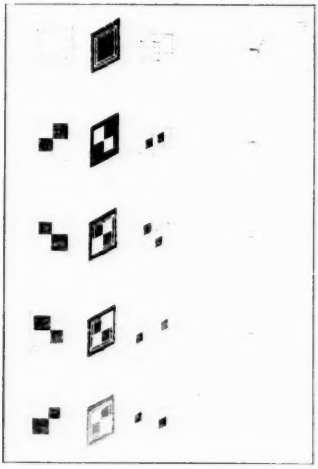

Diagram V.

from the corresponding station point the face of an X-ray print (or it might be the glass side of the X-ray negative), while on the right side of the diagram the observer is contemplating what may be either the film side of a developed glass negative according to prevailing usage, or the back of an X-ray print therefrom, supposed to be semi-transparent. In the third figure both observers are viewing the original object itself from opposite sides, in the same position thereto as in the first or second figures. In the fourth or lowest figure the observers are viewing the actual object from opposite sides of it; but while the observer on the right retains his original station point, the observer on the left has taken another likely station point on the axis, namely a point corresponding to the opposite mean distance from the object. In this figure I have indicated graphic planes in relation to both observers. No doubt there are other special cases not represented in the diagram, but it will be found that under no circumstances will an observer on the side of the X-ray picture plane remote from the original station point ever see the shadow picture wholly in perspective with the object throwing the shadow, while the observer with his eye in the original station point of the X-ray centre of emission in regard to object and X-ray picture plane will always continue to do so. But from what I call the wrong side of the picture plane, the observer can see only the shadows on the window blind; if provided with a pistol he must aim wide of his object (with the two exceptions I have indicated) and miss his mark: what he ought to do is to come out of the street and take sights through the key-hole.

In comparing shadow pictures in the matter of outlines with photographs and drawings of the same object from the same centre of projection, it is convenient to take some very definite shaped body at once X-rayable and visible, *e.g.* a right-handed cube with its back turned towards the centre of projection, made in a sort of open framework of opaque metal and painted black (Diagram III). In the top figure of this diagram are represented some of the photographic relations; on the extreme right is shown the inverted image as it would appear

on the focusing screen of a camera ; the next image on the left is an erect photographic print of the same size ; the third image on the left is an enlarged photographic print. To avoid considering the perplexing subject of focusing by a lens at different distances, I have represented the camera as a very efficient pinhole one, the pinhole being further, as a matter of fact, closely comparable in size to the bombarded area on the target of the focus tube. In this figure is also indicated in outline an enlarging photographic camera. The second figure represents ordinary shadow projection by means of a small luminous flame. The third figure shows the image thrown by X-rays upon a fluoroscope supposed to be semi-transparent, or it might be an X-ray print illuminated from the left and showing through its paper back. The fourth figure shows an X-ray developed glass plate with its film side turned towards the focus tube as it actually lay at the period of exposure. The lowest figure shows the draughtsman finishing his task.

While Diagram III represents picture making, its continuation, Diagram IV, represents mainly picture viewing. The top figure represents simple vision of the object directly ; the next figure the contemplation of an X-ray print through its back ; the third the inspection of an X-ray negative from its face ; the fourth shows the viewing of a finished drawing, or it might be a photographic print ; while the lowest figure is a diagrammatic combination of the other cases, with an attempt at a rude dissection to expose the ocular camera itself.

Under the conditions set forth, all the images shown in the last two diagrams are similar in *form*, and are all in perspective register with each other and with the object, but they differ here and there in size and *tone*. Some are black on white, others are white on black. Photographic prints and the photographic picture on the focusing screen, the picture on the fluorescent screen, the ordinary shadow and the drawing as a rule are all black on white, what are called " positives," from whichever side of the picture plane they are viewed : the shadows (or the interruption by opaque bodies of the luminous agent) are black, while the high lights are white, so that where

the luminous agent freely passes (by transmission in the case of X-rays, by reflection as a rule in the case of ordinary light) black on white is the correct arrangeemnt of tone. The photographic plate when developed, and the X-ray photographic plate when developed and suitably illuminated, are white on black—an incorrect arrangement of tone—what are called "negatives," from whichever side they are viewed. Correct *form*, therefore, depends not on *tone*, but on viewing the photographic or other positive or negative from the correct side of the picture. The analogy between the photographic and the X-ray print is correct as to *tone* only, but entirely misleading in the much more important matter of *form*. The X-ray negative viewed from its film side is the only true analogue of the photographic print as to *form*.

The next diagram (V) illustrates probably one of the most important points in a thorny subject, and certainly one of the hardest to explain and understand. In the two previous diagrams the object was a right-handed cube with its back towards the centre of projection and station point of the eye. When we view a right-handed cube of this kind in a plane mirror, we see a left handed cube, and vice versa. In the top figure of the present diagram is drawn an undifferentiated cube with its radiographic negative-image and print; its top and bottom, and back and front, and two sides are all indifferently alike. In the second figure is shown a right handed cube with its back towards the radiographic centre as in previous diagram; in the third figure there is as object a right-handed cube with its face turned towards the focus tube; in the next figure is drawn a left-handed cube with its face next the radiographic plane; and in the lowest figure the object is a left-handed cube with its face towards the radiographic centre. In the case of these last four objects are shown the X-ray negative (white on black) images, and the print corresponding to each (black on white). Let us call these negative images of the figured cubes from above downwards A, B, C, D, and the corresponding prints a, b, c, d. Then, allowing for the perspective inclination of the lines receding at right angles from the plane of the

diagram, it will be found that in *form* a is the same as C, b is the same as D, c is the same as A, and d is the same as B, each as each. In other words, in radiography, as in other graphic images, the other side of a picture is not a picture of the other side of the object portrayed; the other side of a picture is a picture in perspective with a reversed object—an object reversed as in a mirror—and with the same aspect of it presenting to the observer in each case. And the same principles must apply to all parts of the human body, *e.g.* a right hand or a left foot, or to the heart normally situated on the left side of the chest. It is a good mental gymnastic to mentally substitute a right or a left hand with back or palm turned to the radiographic centre for the corresponding cubes of the diagram; in the case of the normally-situated heart we would only have two cases, as the breastbone or the spine were turned to the photographic plate; the prints (black on white) would then represent an imaginary normal dextrocardia, pathological dextrocardia being a different thing entirely. As regards *form* therefore, A, B, C, D are direct images in perspective with the corresponding objects, while a, b, c, d are the corresponding reverse images. We now can understand what these reverse images (like X-rays prints viewed from their face, or like the fluorescent screen or X-ray glass plate viewed from the side remote from the focus tube) represent really; these and the reverse or back of any picture are pictures of a reversed, it may be an unreal, object. What the observer thinks he sees is quite another question.

Such an ideal object as that employed in previous diagrams is of course quite exceptional. As a rule, the object we have to X-ray for diagnosis in practice is superficially visible, with its surface markings and recognisable landmarks, while in the mass opaque to light. Only the side nearer the station point of the eye can be seen therefrom. As regards X-rays, the mass is mainly transparent, so that only parts opaque to X-rays are shown up. The problem is to combine correctly as regards direction the graphic picture of the near side with the radiographic pictures of the interior. We may draw a cubical box

with its superficial markings, the box being opaque to light, while it is materially strengthened inside by various bars and rods which are more or less opaque to X-rays, and its contents are supposed to be two air cushions and a bag containing small shot. In diagram VI such an object is shown as taken from one side, and in VII as taken from the other. The combination of the graphic and diagraphic image may be made by ordinary photographic or graphic methods, either on the diagraphic or on the graphic plane as indicated; of course, the latter plan is far and away the most natural and convenient one. I believe myself some form of camera lucida would be of great value in bringing the radiographic image on to the selected surface of delineation, using the necessary precautions to secure direct images only; then at last we would have succeeded in taking sights through the keyhole.

I have ventured in the VIIIth diagram to show experimentally (by copying to scale a frozen section of the human chest at the level of the 7th or 8th dorsal vertebra), among other things the possibility of applying these principles to the human body. The two graphic planes are shown as drawn by hand, they are not really photographic reductions. The bullet shown on the right side of the chest about the tip of a transverse process of a vertebra is also ideal.

The next step must be the clinical one. I do not now expect ever personally to have either time or opportunity to make that farther step; like the sign-post, I can only point the right direction. With a few brilliant exceptions, clinical radiography on wrong lines must be largely futile.

There remains the unfortunate position of the votaries of the fluorescent screen, which is only, after all, a kind of view finder. With the screen the medical radiographer is like the tourist who found himself in the wrong train, while his luggage remained in the right train, or like "Alice through the Looking Glass." Yet he might get back (by some much more simple apparatus than the ortho-diagraph) by the use of appliances everywhere at hand. In fact, for him could be visualised the radiographic centre.[3]

O, then, is the centre of all our diagnostic hopes. How is it to be recorded, and how reproduced? One simple means is some apparatus that really is a radiographic camera, which I have provisionally called the "camera (perhaps better antecamera) aperta." Details will be found elsewhere. The principle is to keep the radiographic centre always perpendicularly opposite the geometrical centre of the screen or other X-ray picture.[4]

Unfortunately for our profession Röntgen was not like Helmholtz a medical man. The initial error was made by the German physicians and surgeons. It is not difficult to see how it has arisen and even how it has persisted. But once the medical radiographers are convinced, everything will come right, and radiography will take its proper clinical position, and cease to be so much a happy hunting ground for the mechanical engineer.

There are at least three simple ways by which direct X-ray images in perspective with the object can be obtained correct both in form and in matter of tone, namely with dark shadows and white high-lights; but the adoption of any such plan while the present paradox is still paradox (awaiting promotion to heresy) would only lead to confusion worse confounded. As at present, then, let white on black remain the X-ray negative viewed from the film side, and let black on white remain the X-ray print viewed from its face—until, in short, paradox becomes orthodox. But I would appeal to all editors and printers that they will be kind enough to leave the backs of their X-ray reproductions unprinted on, so that the X-ray print—black on white—can always be held up to the light, and viewed through its back by the increasing number of medical radiographers who will take the same point of view as myself.

One can do very much what one pleases with straight lines upon a large drawing-board, and with great accuracy: and many facilities are afforded to the experimenter in the absence of unsteadiness and flickering, and in the possibility of spacing one's diagraphic plane well away from the object.

I have to thank Professor Barrell, of Bristol University, for

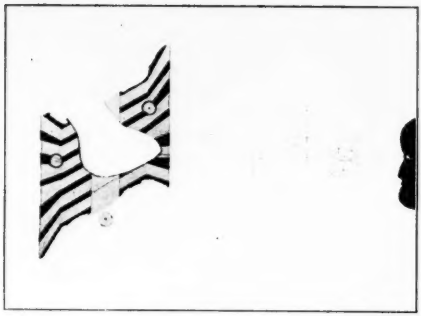

Diagram VI.

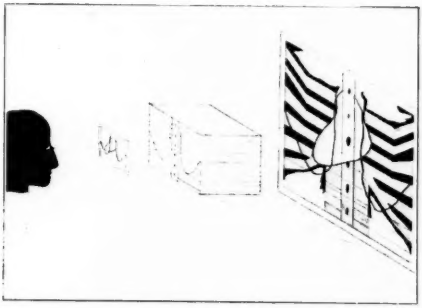

Diagram VII.

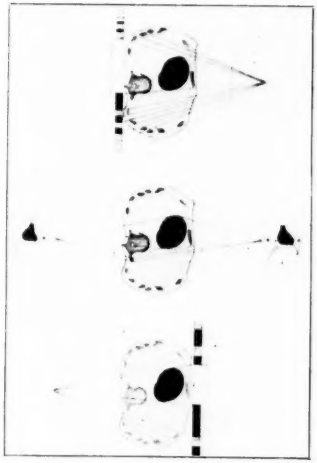

Diagram VIII.

revising the mathematical part of this paper, and Mr. W. H. Hawker, Bristol, for his photographic reductions of the original diagrams.

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[3] "The Fluoroscopic Diagnosis of Direction by a Plane Mirror upon the Screen," *Practitioner*, 1911, lxxxvi. 725.

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THE RELATIONSHIP BETWEEN TOXICITY AND CHEMICAL REACTIVITY IN CERTAIN BENZENE DERIVATIVES.

BY

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IN determining the pharmacological value of an organic compound, information can best be obtained by direct experiments on living animals, and all other means of investigation must be regarded as of secondary importance.

In many cases it appears that this may be largely due to the fact that the nature of the decomposition which a compound undergoes within the organism may differ essentially from its decomposition *in vitro*, and this makes it difficult to predict the action of any new drug until its products of decomposition *in vivo* have been ascertained. With the knowledge at present available it is quite obvious that it cannot always be possible to foretell the physiological action of a drug from its chemical properties and stability; but in the present paper an attempt is made to show that in certain cases there is a direct and apparently quantitative relationship between chemical constitution and toxicity. In order to study this relationship, it is necessary to select some definite series of

organic compounds which (*a*) can be prepared in a state of great purity, (*b*) react in an identical manner with certain re-agents, and (*c*) possess a well-marked and similar physiological action.

Unfortunately, there is not a very large number of chemical series available for this purpose, but certain aniline derivatives have been investigated from both chemical and pharmacological standpoints, and the comparative results are of special interest to the student of pharmaco-dynamics.

For a considerable number of years certain of the " anilides " have found an application in practical medicine, being used as antipyretics. They are the " acyl " derivatives of aniline and its congeners, and their activity is due primarily to the fact that they are slowly hydrolysed within the organism, giving rise to the amine and acid from which they are derived according to the general equation :—

$$R.NH.Ac + H.OH \rightarrow R.NH_2 + AcOH.$$

Small quantities of the free base are thus gradually introduced into the system, and a medicinal effect produced side by side with a very greatly diminished toxicity compared with that of the parent amine. One of the first members of the series to be used for medicinal purposes was the acetyl derivative of aniline or acetanilide, commonly known as antifebrin, which has been largely employed under this name, and also as a constituent of proprietary headache powders.

Within the alimentary system this compound is hydrolysed with liberation of free aniline and acetic acid or their salts.

Experiments have been made by physiologists on the toxicity of numerous anilides, and the following conclusions have been drawn (1) :—

That the toxicity of these compounds gradually diminishes as the length of the carbon chain in the " acyl " group increases ; thus formanilide, unlike its immediate homologue acetanilide, is far too toxic for internal administration, and in the aromatic series benzanilide is practically without physiological action. Some few years ago the rates of decomposition of a considerable

number of anilides were investigated, hydrolysis being brought about by boiling with standard sodium hydroxide, according to the equation (²):—

$$R.NHAc. + NaOH \rightarrow RNH_2 + AcONa.$$

The following results were obtained, " K " being a constant denoting the average velocity of decomposition :—

Compound.	*Time for* 50 % *decomp.*	*K.*
Formanilide	0.14 hrs.	87.1
Acetanilide	3.79 ,, ...	3.20
Propionanilide	6.30 ,, ...	1.93
N. Butyranilide	13.0 ,, ...	0.934
N. Valeranilide	18.5 ,, ...	0.656
Benzanilide	Not affected.	

On the assumption that the physiological action of this series is primarily due to the liberation of the free amine, it is quite obvious from these results that formanilide would prove far more toxic than acetanilide, since the constant indicates that the former compound is decomposed approximately twenty-seven times as quickly as the latter ; the results also lead us to suppose that toxicity would diminish with increasing molecular weight of the acid from which the compounds are formed.

During the last twenty years a considerable amount of research has been carried out on the rates of formation and decomposition of numerous organic compounds ; the results obtained are of great interest, but are incomplete in themselves, as in all probability two distinct factors are involved, which determine the reactivity of organic compounds, namely their " chemical affinity " or power to react, and also the " frictional resistance " which they offer to any given reaction. It is therefore obvious that rates of reaction may be influenced by one or both of these factors, and thus a determination of velocity constants only does not give us a direct measurement of chemical affinity. There are two recognised methods for measuring this property, one being to determine the electro motive forces of the substances under investigation, and the

other to find the position of equilibrium in a balanced action, and calculate the affinity from recognised formulæ in which the equilibrium constant is introduced.

Although from a theoretical standpoint all chemical reactions are reversible if suitable conditions are chosen, yet the number of definite cases where distinct equilibria can be attained and accurately measured is not great. A series of such reactions has recently been investigated,[3] the interaction of formic acid with aniline bases in pyridine-water solution having been traced from both sides of the equation :—

$$R.NH_2 + HCOOH \rightleftarrows R.NH.HCO + H_2O.$$

A large number of bases were experimented with, and the equilibrium constants calculated from the formula—

$$K_W = \frac{C_1}{C_2 \times C_3}, \text{ where}$$

K_W = equilibrium constant, and C_1, C_2 and C_3 the respective concentrations of anilide, amine and acid at the position of equilibrium.

Unfortunately, at the present time only a few of the bases investigated have had their relative toxicities determined. Diagram I was obtained by plotting both the reciprocals of K_W and the toxic doses per kilogramme body-weight of the toluidines[4] on equidistant ordinates to empirically represent the ortho, meta, and para-orientations. It is well shown that toxicity is approximately directly proportional to chemical affinity, since this property varies with the equilibrium constant and toxicity is inversely proportional to toxic dose.

In this connection two well-marked cases have been thoroughly worked out, showing the application of theory to practice.

It has been found by Breinl and Nierenstein[5] that whereas p. amino-phenyl-arsenic acid, the sodium salt of which is known as atoxyl, acts promptly on trypanosomes, the meta-compound has a less effect, and the ortho-compound no effect at all. A similar regularity was noticed by the same observers[6] in the case of the corresponding antimony compounds.

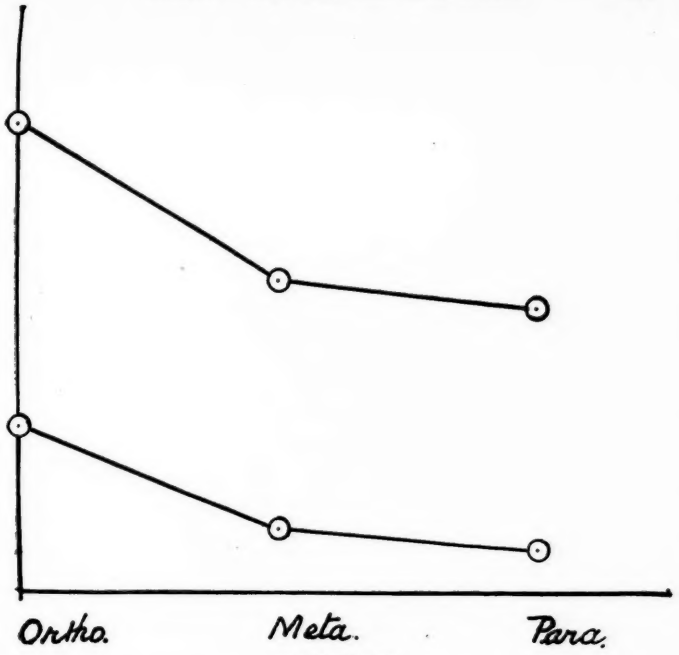
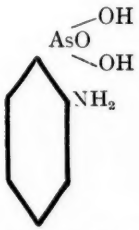


DIAGRAM I.

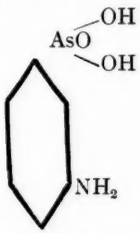
The upper curve represents the toxic doses of the isomeric toluidines, the lower curve denotes the reciprocals of the equilibrium constants of the toluidines reacting with formic acid (N/1 solutions in pyridine and water).

The relationship between the compounds is shown by the following formulæ :—

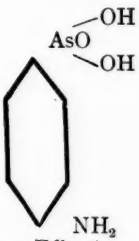
Arsenic Compounds.



Ortho—No effect.

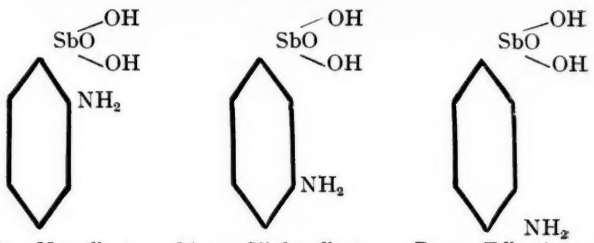


Meta—Slight effect.



Para—Effective.

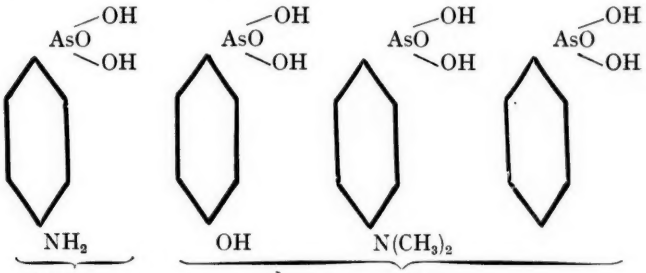
Antimony Compounds.



Ortho—No effect. *Meta*—Slight effect. *Para*—Effective.

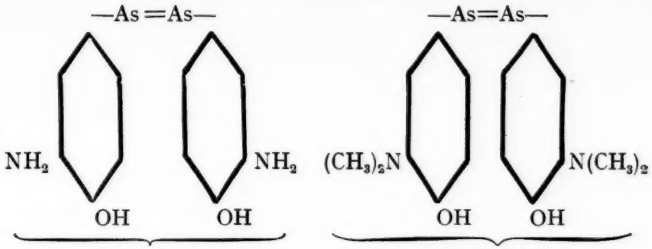
These investigators are of the opinion that these differences are due to the different reactivities of the amino groups towards the proteins, as they were able to show that the action of the drugs on the parasites only takes place after they have combined with protein.[7]

Some further interesting work on the importance of the amino group ($-NH_2$) as an "anchoring group" have also been carried out with "atoxyl" by Nierenstein, Breinl and others, who showed that by replacing $-NH_2$ by $-OH$, $-N(CH_3)_2$ and $-H$, the compound loses its action on trypanosomes[8] both *in vitro* and *in vivo*. This is expressed best by the aid of graphic formulæ.



Effective. Not effective.

Quite recently Ehrlich's co-worker, Bertheim, has shown that the well-known drug "606" becomes ineffective when $-NH_2$ is replaced by $-N(CH_3)_2$.[9]

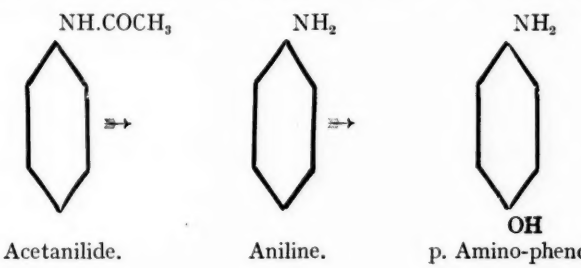


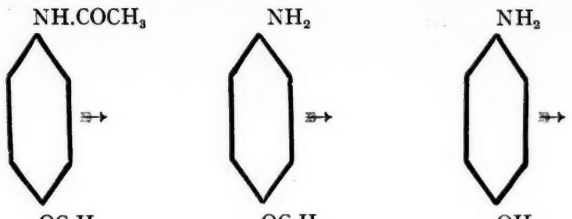
There are, however, certain cases where chemical reactivity and toxicity have both been determined, with results which at first appear to be at variance with the previous observations.

For instance, on determining the rates of hydrolysis of the four compounds exalgin, acetanilide, methacetin and phenacetin, the following values were obtained :—[10]

Compound.	*Time for 50 per cent. decomp.*	*K. (average velocity constant).*
Exalgin	3.16 hrs.	.. .. 3.84
Acetanilide	3.79 ,,	.. .. 3.20
Methacetin	3.57 ,,	.. .. 3.40
Phenacetin	3.70 ,,	.. .. 3.28

Considering the two best known of these compounds, acetanilide and phenacetin, it is seen that they are decomposed at almost identical rates, whereas the latter substance is far less toxic than the former. This is probably due to the fact that aniline bases are largely excreted as a less toxic oxidation product. P. amino-phenol, which, judging from the structural formulæ, would be more readily formed from p. phenetidin than from aniline.





Phenacetin. p. Phenetidin. p. Amino-phenol.

An interesting relationship is also noticed when we compare the " affinity constants " of the chlor-benzoic acids [11] with their toxicities, and find the two factors inversely proportional to each other. This is well shown in Diagram II, where the toxic doses per kilogramme body-weight are plotted on the same ordinates as the affinity constants, the resultant curves running in the same direction.

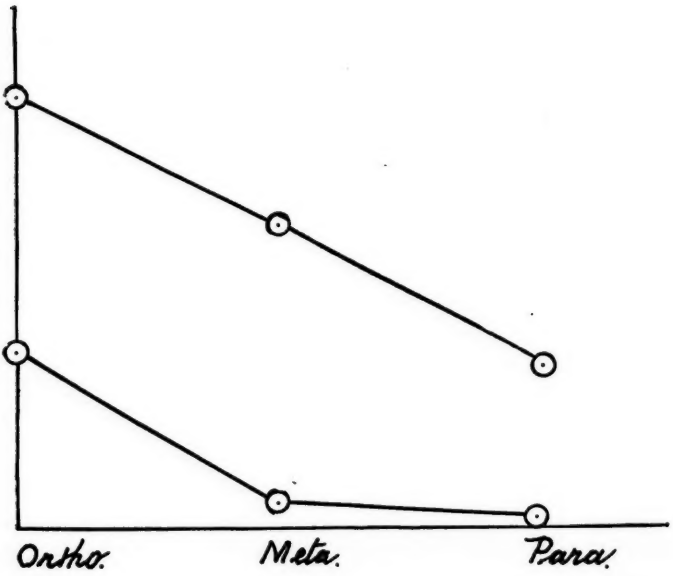


DIAGRAM II.

The upper curve represents the toxic doses of the isomeric chloro-benzoic acids. The lower denotes the " affinity constants " of these acids.

The question naturally arises why the toxicities should, in the case of the toluidines, be proportional to their chemical affinities, and with respect to the chlor-benzoic acids inversely proportional to these constants. When we consider each case separately, however, an explanation can be offered, since in both instances it may safely be stated that toxicity must depend on three factors, namely :—

The affinity of the compound for protoplasm, *i.e.* the reactivity of the " anchoring group " (in the case of the toluidines $-NH_2$).

The vigour with which the " anchored " main portion of the molecule (in the case of the toluidines $C_6H_4CH_3$—)

(*a*) Behaves towards protoplasm.

(*b*) Gives rise to excretion products.

Thus we may write a hypothetical equation :—

$$\text{Drug} + \text{cell} \rightarrow \text{cell-drug}.$$

During the next stage two reactions may be taking place side by side, one producing a physiological effect, and the other giving rise to excretion products, and we can assume that where there is a great affinity between cell and drug the pharmacological action will be correspondingly great, and will be diminished by any factor which increases the rate of excretion of the drug.

Now it has been observed that the isomeric chlor-toluenes ($C_6H_4Cl.CH_3$) are first oxidised within the body to chlor-benzoic acids, ($C_6H_4Cl.COOH$), and then excreted as the corresponding chlor-hippuric-acids, which are condensation products of chlor-benzoic acids with glycine. It has also been shown that " ortho " chlor-toluene is the least toxic and " para " chlor-toluene the most toxic of the three isomers [1 2].

The chlorinated benzoic acids, when administered as such, would doubtless also be excreted as chlor-hippuric acids, and we should expect that isomer with the greatest " affinity " for glycine, *i.e.* the one with the greatest affinity constant, to be most readily excreted, therefore less toxic than the other isomers.

It is, of course, quite probable that excretion may take place without the formation of a "cell-drug" compound, but this does not materially alter the views herein suggested. It therefore seems desirable to introduce some new terms into the literature on the subject, and to express the relationship by means of an equation which would of necessity only be of a qualitative nature. Thus the term "physiological affinity" might be used to express the readiness with which a chemical compound reacts with protoplasm, and this in many cases would doubtless be closely related to the "chemical affinity" of the compound in question. The ease with which the same compound gives rise to excretion products might also be denoted by the magnitude of a hypothetical "excretion constant," and a new expression would be necessary :—

$$\text{Toxicity constant} = \frac{\text{Physiological affinity.}}{\text{Excretion constant.}}$$

If we now examine a few special cases from this point of view a new light is thrown on certain observed facts. It is not unreasonable to suppose that in the case of the toluidines the "ortho" compound is least toxic, because it possesses the lowest "physiological affinity," and the relative ease with which it is excreted does not counteract this factor.

The same remarks would apply to the arsenic and antimony compounds investigated by Breinl and Nierenstein (*loc. cit.*). With regard to the hydroxy-benzoic acids, it is generally stated that the "ortho" compound (salicylic acid) is the only isomer which is physiologically active. The "affinity constants" of these acids are :—[13]

Ortho	hydroxy-benzoic	acid	0.102.
Meta	,,	,,	0.00867.
Para	,,	,,	0.00286.

In all probability the hydroxyl group serves as the chief "anchoring group," and we might expect that isomer having the highest chemical affinity to possess the greatest physiological activity, provided the "excretion constant" does not upset

this relationship, as is the case of the chlor-benzoic acids. It should here be mentioned that according to Hildebrandt[14] salicylic acid is not eliminated in the same way as its isomers, and this may have an influence on its toxicity.

I would emphasise the fact that the ideas brought forward in this paper are merely speculative, but it is hoped that further work may throw more light on an important and fascinating problem.

My thanks are due to the Government Research Committee of the Royal Society for a grant to defray the expenses of some of the chemical work herein mentioned.

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RAYNAUD'S DISEASE.

BY

DAVID A. ALEXANDER, M.B., Ch.B.Vict.

WE went in to luncheon. Something was said of our friend —— and the new-found malady, Raynaud's disease.

J. M.—Joseph de Maistre says that in the innocent primitive ages men died of diseases without names.

Mr. G.—Homer never mentions diseases at all.

J. M.—Not many of them die a natural death in Homer.

Mr. G.—Do you not recollect where Odysseus meets his mother among the shades, and she says :—

> Οὔτε τις οὖν μοι νοῦσος ἐπήλυθεν . . .
> ἀλλά με σός τε πόθος σά τε μήδεα, φαίδιμ' Ὀδυσσεῦ,
> σή τ' ἀγανοφροσύνη μελιηδέα θυμὸν ἀπηύρα.

> It was not sickness that came upon me ; it was wearying for thee
> And thy lost counsels, glorious Odysseus, and for all thy
> Gentle kindness, this it was that broke the heart within me.

J. M.—Beautiful lines. Πόθος such a tender word, and it is untranslatable.

Mr. G.—Oh, *desiderium.*

> Quis desiderio sit pudor aut modus
> Tam cari capitis.
>
> What shame or limit should there be
> In longing for so loved a friend.

J. M.—The Scotch word "*wearying*" for somebody. And *Sehnsucht.*

Morley, *Life of Gladstone,* vol. iii.,
date Dec. 17th, 1890.

A. F. is a tailoress of 38. In February, 1911, she complained of an intractable ulcer on the extremity of a toe, which had been regarded as a broken chilblain. After treating it for two or three weeks with no success, I chanced one day to observe her fingers blanch, and suspected that she was a sufferer from Raynaud's disease, and that the key to her condition was the state of the vaso-motor system.

She is of a neuropathic stock. An uncle had attacks of insanity from an emotional cause—grief at the sudden death of a son. The members of her own family show for each other an anxiety and solicitude which is almost morbid. At the age of twenty—seventeen years past—she sustained a shock in the death of her father. To the fact that "she nor spake nor uttered cry" do her friends attribute the development directly afterwards of epilepsy.

She is of fully middle height, big boned, thin, with a sunken aspect, a pensive and rather hungry look. The complexion is usually red and dusky ; the skin moist and warm when not under the influence of her affection, resembling that of other members of the family ; the pulse is regular and soft and of low tension ; the arteries unthickened and resilient ; the eyes are prominent ; the thyroid unenlarged ; the digital joints unthickened ; the fingers attenuated, and the skin over them thin

and papery. The features of Raynaud's category have shown themselves at different times.

Local syncope.—In genial weather and when the complaint remits little is to be remarked. Often, however, there is a marbling or mottling of the hands, noticeable in itself, and not to be overlooked when the intenser vascular derangements have been once seen. It is the fingers and toes which local syncope affects. The onset is without pain ; the attacks are succeeded by numbness and tingling. They are inconstant and fleeting ; their duration seldom an hour, usually to be told in minutes. I had often seen the patient before observing the first, and she might readily have continued to exhibit one complaint or another without the peculiarity revealing itself as the nexus and explanation of them all. In his work on the subject Monro descants upon the fugacious character of the attacks, and also the permanent effects of the disease comprised in a single occurrence of spasm.

Local asphyxia.—This accompanies or follows the preceding, and the contrast between purple and white is then conspicuous. On a January evening, when the patient was introduced to a clinical meeting, the coldness of the night brought out these features, for she had come unprovided with the mittens or goloshes, or that extra clothing such sufferers are advised to wear. During adolescence she had indeed been liable to cold feet and to chilblains, but not as she is now to " blueness " and deadness of the fingers.

Local gangrene.—It was the third left toe where this appeared. The extremity was affected, not the dorsum as is usual in chilblain. The end of the toe looked as if it had been bruised, and eventually presented a gangrenous ulcer ; pain was great, and from the toe radiated up the calf, but there were no symptoms of neuritis. As the patient's condition improved under rest and care and opium, the nature of the lesion became clearer ; a fragment of skin sloughed off, owing to occlusion of its vessels, and a cicatrix formed, which still marks the area. It is true that in this case there was no corresponding affection on the right side to illustrate the symmetry of this disease. Perhaps it is also significant that at this time on the left calf was a recrudescence of eczema, which had broken out seven years before. There was none of the cuticular shredding which characterises eczema rubrum, and after recovery the skin was seen to be thinned and atrophic, and with here and there a small underlying nodosity.

Skin affections.—Of erythema nodosum (says Malcolm Morris) the pathology is that of hyperæmic erythema. Local vaso-motor disturbance is followed by inflammatory effusion of fluid and escape of white blood corpuscles. Seven years ago the patient had a severe attack of " rheumatic lumps," and I

take the small nodosities under the skin to be their vestiges. She has recently undergone another, at the age of nearly forty, when such outbreaks are uncommon. The nodes appear on shins and knees, a few on the arms; they are larger than is usual; are tender and very painful; they leave as they pass some purpuric discolouration. When the patient stands the legs became œdematous and cyanotic. There is no joint effusion nor cardiac affection. The first week was pyrexial.

It will be recalled that French and German writers recognise two affections as peculiar to Raynaud's disease. *Regional ruber*, in which isolated spots appear, red, like fuchsia, resembling a raspberry, with vessels injected, with elevation of temperature (Weiss). *Tachetes*—reddish-blue or purple patches, not removable by pressure, sometimes very persistent, due to extravasation of blood in the deeper folds of the skin.

Paresis.—One transient attack illustrated in this case the liability in Raynaud's disease to functional paralyses. It fell during the incidence of the erythema, while the patient was keeping her bed. The right arm became from the shoulder downwards helpless, numb and blue. Such was the account given by the patient and her friends. They could state no exciting cause. It neither preceded nor followed one of her fits, nor had it any of the stigmata of *petit mal*. When she was seen there remained only a relative feebleness in the grasp of the right hand.

With this seizure may be mentioned ocular signs. Certain branches of the retinal arteries are narrow. Students of epilepsy have failed to establish a constant relation between the calibre of the optic vessels, the state of the pupils and the epileptic outbreaks. In Raynaud's disease, on the other hand, a spasm of the arteries has been demonstrated during the prevalence of partial amaurosis. The claudication to be detected here, however, has never given rise to any symptoms.

Epilepsy.—Sir William Gowers asserts that if we are to attribute epilepsy to a shock it should occur before the lapse of a week. I cannot find in the case of this patient how many days passed between her father's death and her first seizure. In the minds of her friends the events are bound together, and with them all her subsequent ill-health also. The attacks have no settled periodicity; most are nocturnal; three weeks rarely pass without a recurrence. As described, they conform to true epilepsy. There is no aura; the somnolence and peevishness which follow are characteristic.

It might be suspected that the bromide the patient takes retards her general betterment. Massive doses never have been given, and strontium sometimes instead of potassium. The cutaneous affections were not complicated by a bromide rash. On the other hand, one admits a diffidence with the drug in a

case where general nutrition is so much called for, and by which alone it might be hoped the attacks would be cured. Epileptiform seizures happen so often with a Raynaud's phenomenon that a common cause must be allowed to them, although we are now forbidden, with Kussmaul and Tenner, to derive epilepsy from spasm of cerebral vessels, and taught by Hughlings Jackson to assign it directly to the cells of the cortex.

Hemorrhage.—On two occasions œdema of the lungs has followed a convulsion, respiration being rapid, breathing harsh, rales everywhere audible, expectoration copious and watery. But the latter was also stained with blood, and not from any such local injury as a bleeding tongue, for it uniformly tinged the frothy sputum. To the friends who knew the significance of hæmoptysis this was a positive proof of a decline. On neither occasion, however, could T.B. be discovered. Expectoration ceased in a day, leaving no local sign of any pulmonary lesion. And should tuberculosis supervene, as it may, I should still regard this feature as a pneumostaxis, and comparable to paroxysmal hæmoglobinuria, although I did not determine whether in the sputum the red cells were intact or not.

Of other symptoms little is to be remarked. There is no osseous atrophy nor digital shortening, albumen is never found in the urine, menstruation is irregular. Digestion is most feeble; for milk there is a standing aversion, and this is very unfortunate when nutrition is essential and calcium might prove specific. Calcium chloride as a drug was without effect. Opium has served well in time of pain, and not vaso-dilators, but adrenalin seemed to coincide with a period of betterment.

The prognosis in Raynaud's disease is not invariably bad, and the patient's present debility ought not to deny her the rallying influence of hope. Time may weaken the fretting of the emotions and the perturbations of the vaso-motor system may then cease, a stable physiological state be regained, diet resumed, and the malady and its name be forgotten.

Progress of the Medical Sciences.

MEDICINE.

Gastric Analysis.—The value of analysis of test meals and stomach contents can only be appreciated properly provided we can compare the findings with a sufficiently large number of observations of normal and abnormal conditions to furnish a standard of averages. Panton and Tidy[1] have published some useful studies in gastric analyses, which may be tabulated as follows:—

1. *Normal Subjects.*
   Günzberg's Test +. Free HCl.=0.08 to 0.12.
   Total acidity 40 to 50.

2. *Carcinoma of Stomach.*
   Günzberg's Test nearly always −, *i.e.* Free HCl=0.
   Some dimethyl acidity often present.

3. *Simple Gastric Ulcer.*
   Günzberg's Test +. Free HCl. (average)=0.13.
   Total acidity 58.
   Free HCl. absent after severe hemorrhage.
   Free HCl. absent after previous gastro-jejunostomy.

4. *Duodenal Ulcer.*
   Günzberg's Test +. Free HCl. (average)=0.17.
   Total acidity 69.

5. *Free HCl. usually absent in carcinoma of the stomach, achylia gastrica, chronic alcoholic gastritis, severe anæmia, chronic pulmonary tuberculosis, and some forms of chronic dyspepsia.*

So far as averages can be of assistance, these figures will be found useful for reference. When, however, the limits of variation are considered, it will be seen that the argument from the general average to the particular case is likely to prove unreliable.

MAXIMUM AND MINIMUM FINDINGS.

1. *Carcinoma.*

Free HCl.	Total Acidity.
Maximum=0.14.	Maximum=70.
Minimum=0.	Minimum=0.

(Absent in 39 cases out of 43.)

2. *Simple Gastric Ulcer.*

Free HCl.	Total Acidity.
Maximum=0.21.	Maximum=86.
Minimum=0.06.	Minimum=34.

3. *Duodenal Ulcer.*

Free HCl.	Total Acidity.
Maximum=0.3.	Maximum=105.
Minimum=0.08.	Minimum=43.

(Total absence in 1 case.)

The *total acidity* figure is the number of c.c. of decinormal soda solution required to neutralise 100 c.c. of the given test meals.

The *free HCl.* is given in percentage terms, one litre of decinormal soda solution being required to neutralise 3.65 gm. of HCl.[1]

The *test meal* used by Panton and Tidy was practically that of Ewald, and consisted of two large cups of tea, with milk and sugar if desired, and two rounds of toast lightly buttered. The stomach was washed out a few hours before the test breakfast was given, and the gastric content was withdrawn by siphonage one hour afterwards without the addition of water. It was then filtered, and the filtrate and residue examined by various tests. The following simple analyses were always performed :—

1. With a portion of the filtrate Günzberg's phloroglucin vanillin test was performed in the usual manner, a positive reaction being taken as an indication of the presence of HCl.

2. To 10 c.c. of the filtrate, well diluted with water, three drops of dimethylamidoazobenzene were added, and decinormal soda run in from a burette until the pink colour was converted into yellow. This point coincides with the neutralisation of free HCl. in a solution of known strength. From the amount of decinormal soda used the amount of free acid was calculated, and when the Günzberg reaction was positive was taken to indicate HCl. The normal acidity by this method is the equivalent of 0.1 per cent. free HCl.

3. After neutralisation to dimethyl three drops of phenolphthalein were added to the same solution. Decinormal soda was run in until the first appearance of a permanent faint pink colour, the total acidity being given as the number of c.c. which neutralise 100 c.c. of the given test meal. The normal total acidity varies between 40 and 50.

X-rays in gastric diagnosis have been proved by Hertz[3] to be of the greatest value. Our knowledge of the anatomy and physiology of the stomach has been revolutionised as the result of this method of investigation.

The method of investigation consists in the administration of two ounces of bismuth oxychloride in bread and milk or porridge, and observing the shadow of the bismuth with X-rays either directly upon the fluorescent screen or on photographic plates. The patient should be examined both standing and lying down, and at varying intervals.

The *fundus*, which lies beneath the left dome of the diaphragm, and always contains gas, passes into the body of the stomach at the level of the cardiac orifice. In the vertical position the body is nearly of uniform width, is situated entirely to the left of the middle line, and is either vertical or inclines slightly to the right. It is separated from the *pyloric part* of the stomach by the *incisura angularis* on the lesser curvature (the pre-pyloric sphincter[4]). The pyloric part consists of the *pyloric vestibule* (or *antrum*), which is directed upwards as it passes to the right of the middle line and the *pyloric canal*, which is about one inch in length, passes backwards

upwards, and to the right, ending in the duodenum, and is normally empty from contraction of the sphincter, even when the rest of the stomach is full. With the X-rays any abnormality in the position or shape of the stomach can be observed, but it must be borne in mind that the skiagram will show a material difference in the position of even a normal stomach, according to the vertical or horizontal attitude of the patient. Hour-glass contraction can be readily recognised, and a functional contraction of this nature may be distinguished from the organic form by the fact that in the latter the neck does not pass from the most dependent part of the upper segment.

Adhesions leading to fixation or deformity of some part of the stomach can be recognised with the X-rays, but they give no signs distinctive of cancer. Atonic and obstructive dilatation, with or without ptosis, are clearly displayed. Hypertonus, a sign commonly caused by duodenal ulcer, and rarely present in gastric ulcer, is easily diagnosed by the fact that the greater curvature does not reach the umbilicus in the vertical position.

The activity of peristalsis can be determined by X-rays, as well as the rate of evacuation of the stomach.

The **glycyl tryptophane test for the diagnosis of gastric carcinoma** has been again reported upon favourably by Neubauer and Fischer,[5] who conclude as follows: "Normal gastric juice does not split glycyl-tryptophane. The stomach contents in definite carcinoma gives almost regularly a positive reaction" (84 per cent. of cases verified by autopsy, 75 per cent of cases diagnosed clinically). "Other diseases of the stomach were as a rule negative."

The tryptophane test[6] depends on the power of ferments present in the cancer juices to break down proteins into amino acids. Tryptophane is an amino-acid which is split out of the protein molecule by trypsin and by the autolytic enzymes of tissue cells, whether they be normal or cancer cells; but the pepsin of normal gastric juice does not disintegrate proteins as far as the amino-acids, and hence tryptophane is not found in normal stomach contents. When disintegrating cancer tissue is present in the stomach, autolytic enzymes may be present in the gastric contents, and may set free tryptophane from the digesting protein. If it has not already been formed, it is necessary to add a compound of tryptophane, glycyl-tryptophane, to the filtered stomach contents and incubate for twenty-four hours before testing. During incubation the glycyl-tryptophane is split into glycin (amino-acetic acid) and tryptophane.

The test for tryptophane is made by adding bromine water cautiously, drop by drop, to 3 or 4 c.c. of the incubated stomach

contents, to which a few drops of 3 per cent. acetic acid have been added. A reddish violet colour indicates the presence of tryptophane. The tryptophane reaction is not characteristic of cancer unless the possible presence of the proteolytic ferment of the pancreas or intestine is excluded.

Weinstein[7] claims to have shown that the use of glycyl tryptophane is superfluous for the detection of tryptophane-producing enzyme in gastric contents. Gastric contents always contain proteoses and peptones that are readily convertible by cancer enzyme into their corresponding simpler peptides and amino acids, including tryptophane.

Austin[8] considers the tryptophane test the most available one for cancer that can be used in a clinic.

It is doubtful how far this test depends on the presence of gastric carcinoma. Walker Hall and Scott Williamson[9] (and more recently Smithies[10]) have suggested that it may indicate nothing else than the presence of blood serum.

Symptomatology of Gastric and Duodenal Ulcers.—From a careful study of one thousand cases of ulcers of the stomach and duodenum Friedenwald[11] draws the following conclusions.

1. In patients suffering from various gastric disturbances 7.8 per cent. are affected with ulcers.
2. The largest proportion of ulcers occur between the twentieth and fiftieth year of age.
3. More than twice as many males are affected as females.
4. Anæmia is present in a large proportion of the cases of ulcers.
5. A history of over-indulgence in food or drink can be obtained in almost half of the number of cases of ulcer.
6. Acidity. The greatest proportion of cases of ulcer presents a normal acidity, *i.e.* 46 per cent., 30 per cent. a hyperacidity, 23 per cent. a subacidity. Hyperacidity is proportionately more frequently observed in males and subacidity in females. In acute ulcers and those accompanied by recent hemorrhages the acidity is very high, while in chronic forms the acidity is low.
7. The average duration of symptoms is twelve years.
8. The most prominent symptom of ulcer, pain, occurs in 94 per cent. of cases, and pain is most frequent in cases associated with a high acidity. Pain appears sometimes immediately after food (gastric ulcer) or long after food (duodenal ulcer). Varying periods of intermission of pain as well as the other symptoms may occur.
9. An epigastric tender area is present in at least 90 per cent. of all cases, a dorsal tender area in 32 per cent.
10. Vomiting is a very prominent symptom occurring in 67 per cent. of cases.

11. Hæmatemesis is present in 22 per cent. of cases and melæna in 51 per cent. Melæna is more than twice as frequent as gastric hemorrhage. Occult blood is present in 81 per cent. of the cases.

12. Of the one thousand cases 52 per cent. are duodenal and 40 per cent. gastric, the largest proportion occurring in males (58 per cent.).

13. Acidity in duodenal ulcers: 48 per cent. present normal acidity, 35 per cent. hyperacidity, and 16 per cent. subacidity, hyperacidity being more frequently observed in males and subacidity in females.

14. Pain is present in 96.5 per cent. of duodenal ulcers, and is most prominent in cases with hyperacidity.

15. Distinct periods of intermission from pain and other symptoms, varying from one to twelve months or more, are exceedingly common in this affection.

16. Epigastric tenderness is present in 89 per cent. of the duodenal cases; a tender area to the right or left of the median line in 7 per cent.

17. Vomiting occurs in 21 per cent. of duodenal cases, and is more frequent in those accompanied by high acidity.

18. Melæna occurs in 54 per cent. of duodenal cases, and occult blood is present in 83 per cent.

Sensibility of the Alimentary Canal.—Hertz,[18] after investigating the sensibility of the alimentary canal to stimuli of various kinds, has arrived at the following interesting conclusions:—

1. The mucosa from the upper end of the œsophagus to the junction of the rectum with the anal canal: Tactile stimulus, negative.

2. Œsophagus and anus: Thermal stimulus, positive.
   Stomach and intestines: Thermal stimulus, negative.

3. Œsophagus and stomach: Dilute HCl. and organic acids, negative.
   Rectum: Glycerine, negative.
   Anus: Glycerine, positive.
   Whole mucosa: Alcohol, positive (sense of heat).

4. The surface of ulcers (gastric and intestinal) is no more sensitive to tactile, thermal, and chemical stimuli than the intact mucosa.

5. The sense of fulness is due to slow increase in tension exerted on the fibres of the muscular coat. There is an adequate tension which is constant for each segment. The volume of contents required to produce this tension varies with the tone of the muscle fibres.

6. The sense of fulness in the rectum has a special character by virtue of which it produces the call to defacation.

7. Hunger is a combination of the general sense of malaise

and weakness with the local sense of an empty stomach. The latter sense is due to the periodical motor activity of stomach and intestines during fasting, in which a condition of muscular hypertonus and nervous hyperexcitability exists.

8. The only immediate cause of true visceral pain is tension exerted on the muscular coat of hollow organs and on the fibrous capsule of solid. In the alimentary canal pain is experienced when there is a more rapid or greater increase in the tension of the muscular fibres than that of the adequate tension for the sense of fulness (see above, No. 5).

9. Pain in diseases of the alimentary canal, although frequently true visceral pain, is sometimes due to the spread of disease to surrounding tissues or tension on peritoneal attachment, or pain of nervous origin referred to skin, muscles and connective tissue.

10. Tenderness generally depends on hyperalgesia of the skin, muscles and connective tissue supplied by the same segment of the central nervous system. External pressure may increase the tension referred to in No. 9.

11. All these various sensibilities may be exaggerated by training in neurasthenia.

J. A. NIXON.

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SURGERY.

The clinical aspects and treatment (early and late) of acute perforating ulcers of the stomach and duodenum.—It may be profitable to the readers of the *Journal* to present a summary of a very exhaustive statistical paper by Ellsworth Eliot on this subject which has appeared recently.[1] The clinical features are important to the practitioner, and the best procedures equally so to the surgeon. The strides have been

[1] *Ann. Surg.*, 1912, lv. 546, 689.

enormous, for some twenty years ago, when the British Medical Association met in Bristol, only half a dozen recoveries had been reported, and it is scarcely thirty years since Mikulicz made the first surgical attempt to save such a case.

Mistakes still occur in **diagnosis,** for it is not always easy; therefore the more prominent symptoms may be considered.

The *history* is that of chronic dyspepsia, but occasionally perforation occurs without any previous warning whatever.

Pain is the most constant symptom: without warning, it is sudden and severe in the epigastrium; and at first, if not later, it is accompanied by the most constant and valuable sign of *muscular rigidity* and *tenderness*, the upper segments of the recti muscles being prominent in a retracted, hard epigastrium, with *thoracic respiration*, one or other costal arch being more resistant according to the gastric or duodenal origin. Disappearance of *liver dulness* and *dulness in the flanks* are variable and uncertain signs.

In the **differential diagnosis** the most common confusion is with *appendicitis*, in which the temperature is commonly raised, and in which the signs point rather to the lower half of the abdomen. On operation the distinction is easy by noting the character of the fluid and the condition of the appendix. *Acute cholecystitis*, especially with perforation of the gall-bladder, may give rise to greater difficulty, but operation will decide. *Acute pancreatitis* may simulate either gastric or duodenal perforation, but the fluid is dark or blood-stained, and there may be fat necrosis. Rarer difficulties are with *intestinal obstruction*, *ectopic gestation*, and *renal calculus*.

It should not be forgotten that ulcers and even perforation may be multiple, and therefore overlooked in part. Statistics point to the desirability of closing the perforation in all cases, and not employing any form of tampon; also to the fact that simple suture of a perforation is quite as safe as excision of the ulcer, and that it is followed by healing of the ulcer. In the early cases peritoneal drainage may not be necessary, but in the later cases it is essential, especially in the subphrenic spaces, for subphrenic abscess is the most frequent and fatal post-operative complication. It is interesting to find in America preference for drainage by soft rubber tubes, as is the practice in this country.

The question of gastro-enterostomy at the time of operation is important. It can generally be omitted with advantage unless the indications for its performance are really strong. The giving way of sutures is not common, and forebodings of subsequent stenosis are not generally realised. Gastro-enterostomy probably diminishes the danger of perforation of co-existing ulcers, but does not entirely prevent it; and it cannot be relied upon to prevent subsequent hemorrhage, for several fatalities

have occurred from this cause even after an added gastro-enterostomy. On the whole, a simultaneous gastro-enterostomy is best omitted, although there are different views on this subject, and corresponding varieties of practice amongst surgeons. The best argument for simultaneous gastro-intestinal anastomosis is that in some thirty-eight published cases a subsequent gastro-enterostomy has been necessary for the relief of symptoms, and these happen to include two of my own published cases.[2]

In the original paper the following tables of published cases are given: Suture, followed by secondary gastro-enterostomy, with relief (38). Ditto, without relief (2). Suture followed by perforation of co-existing ulcers within a month (14). Suture with gastro-enterostomy followed by ulcers within a month (3). Suture followed by remote perforation (8). Suture with gastro-enterostomy followed by remote perforation (3). Suture followed by hemorrhage (10). Suture with gastro-enterostomy followed by hemorrhage (3). Gastro-enterostomy for ulcer followed by perforation within one month after operation (13). Gastro-enterostomy for ulcer followed by hemorrhage (29). Gastro-enterostomy for ulcer followed by cancer (3). Gastro-enterostomy at time of closure of perforation (89 with recovery, 30 with death). In all there were 75 cases in which gasto-enterostomy plus the closure of a perforation would have been of advantage, in the hands of a rapid and experienced operator.

It may be noted that the writer has tabulated the results of gastro-enterostomy for duodenal and gastric ulceration, apart from perforation and comprising one thousand cases from various sources, and the percentage of good results in each class varies from 70 to 80 per cent. In the majority of cases in which simple suture has been successfully performed for perforation the patients have been permanently improved or cured of the gastric symptoms quite apart from gastro-enterostomy.

To the valuable paper of which the above is a summary the writer has added an extensive bibliography, comprising over a hundred references.

T. CARWARDINE.

OPHTHALMOLOGY.

The subject of **miner's nystagmus** has been very much to the fore of late. Now that it has been made one of the scheduled industrial diseases, the colliery proprietors as well as the Government, have been making special inquiries and investigations into its cause and cure, if there is such a thing as a cure. Here in Bristol one does not see quite so many cases as formerly, although cases are not infrequent. A very interesting

[2] *Lancet*, 1910, i. 239.

discussion took place in July at the Oxford Ophthalmological Congress. All the leading ophthalmic men from the colliery districts in South Wales were present, as well as many others from the North and Midland Counties of England, where collieries abound. One was rather astonished to hear of the frequency of the trouble. Several men who have the opportunity of seeing the collier at his work, and coming out of the mine after eight hours of semi-darkness, declared that it was as high as 50 per cent. Some even went as high as 75 per cent. The late Simeon Snell, of Sheffield, was a great advocate of the cause being the faulty position in which the collier worked, while the late Tatham Thompson, of Cardiff, was equally strong in maintaining that position had nothing to do with it, and that it was caused entirely by the work being done in semi-darkness. The discussion was long and slightly acrimonious, as both the disputants were strong fighters. Eventually the Government accepted the theory upheld by Snell, and this is the theory at present officially held by the Board of Trade. To show how opinions alter, it may be mentioned that when three or four members had spoken advocating "the want of light" theory of the cause, the chairman said, "To broaden the discussion a little, we should now like to hear someone who believes in the position theory." Out of thirty-five ophthalmic surgeons and four specially-appointed medical inspectors, not one was found to advocate the position theory. This position theory was founded on the idea that in cutting coal the collier lay on his right or left side, and looked upwards and outwards towards the point of his pick, thus bringing into play his oblique muscles. To prove his point, Snell maintained that he had seen a case in an ordinary chimney-sweep. One knows that this is the position of the eyes during that necessary aid to our domestic life. Now that inspectors have gone down mines to see the men at work, it is admitted that the collier never works above the level of the eyes, but always below. It is also admitted that in mines where the naked light is used miner's nystagmus is unknown. It was pointed out by several that in a great many cases of nystagmus there was a faulty focus of the eyes, which might be looked on as a contributory cause. Several others insisted that the nystagmus was only one symptom in a disease which they called miner's neurosis, and which is characterised by spasm of the orbicularis, photophobia, blinking and loss of vision. The importance of the last symptom was that the miner failed to see the small blue cone of light which forms over the safety lamp in gassy mines, and acts as a warning that the ventilation is not right before any actual disaster occurs. Unfortunately, the time for the discussion was limited to three hours, and the chairman had to decide to rule out the faulty focus and neurosis part, and confine members to

nystagmus *per se.* The upshot of the discussion was the adoption of a resolution, carried unanimously, and to be forwarded to the Board of Trade, to the effect that the cause of miner's nystagmus was insufficient lighting, and that the position theory must be given up.

At the same Congress a useful paper was read by Professor Straub, of Amsterdam, entitled **Scrofulosis,** which is very much the same as struma, and is known as the cause of many ailments of eyes, which one hesitates to call tubercular, but which are no doubt connected with tubercle, though the tubercle bacillus is not actually found in the lesions. His theory is that the tubercle bacilli, having entered the body, may accumulate in the retroperitonal or other collections of glands, that there they remain for some time, producing no symptoms, and during that time they are altered and their virus attenuated. Eventually they may break out and attack various organs, causing a modified tubercular disease. If this explanation is true—and it sounds plausible—it will be a great comfort to many people who at meetings of medical societies describe a condition as being " strumous," and are at once questioned by the ultra-pathologist as to what he means by the word strumous.

As to the treatment of **syphilitic eye affections,** a paper was read and a discussion took place at the Ophthalmic Section of the British Medical Association in July on the use of salvarsan. Mr. Sydney Stephenson opened the discussion. He was strongly of opinion that salvarsan was most useful in irido-cyclitis coming on during a syphilitic attack, and he had never found any trouble with the optic nerve due to its use. He suggested that mercury should be used during the treatment, and in this he was strongly backed up by most of the speakers. It was generally agreed that while salvarsan acted very well in the treatment of iritis, it was practically useless in interstitial keratitis, which is of course also a syphilitic affection in 75 per cent. of the cases. One great difference, however, is that while iritis occurs in the acquired disease, interstitial keratitis is generally found in the inherited form, although it sometimes appears during the course of an acquired case. It has been said that owing to the small amount of blood which enters the eye, these specific remedies have not as much effect as they have in lesions in the rest of the body.

At the same meeting a discussion took place on **irido-cyclitis,** not of the specific variety. The discussion was opened by Mr. George Coats. As time goes on, and the cause of iritis is more and more ventilated, the old theory that iritis is caused by rheumatism and gout is dying out. Mr. Ormond mentioned that of 1,963 cases of acute rheumatism treated at Guy's Hospital, there were so few iritis cases that this cause of the disease must be given up. It was generally admitted that

irido-cyclitis—as iritis alone seldom, if ever, occurs—was the result of general septic intoxication, usually from the intestinal tract. Many cases were known to result from pyorrhœa alveolaris, and disappeared when the pyorrhœa was cured. And so one by one all our old theories of eye diseases are disappearing, and before long an entirely new ophthalmology will have to be written.

A. OGILVY.

Reviews of Books.

Practical Anatomy. By F. G. PARSONS, F.R.C.S., and WILLIAM WRIGHT, M.B., D.Sc., F.R.C.S. In two volumes. Pp. xvi, 467; vii, 382. London: Edward Arnold. 1912.

The authors are to be congratulated upon this modern and truly "practical" manual of Practical Anatomy. It is, perhaps, the first attempt that has been made in this country to write a work of that class upon common-sense lines.

In their Preface the authors state that "they began the book with the idea of leaving out as many facts of anatomy as they dared, because they felt that the modern medical student, with only some fifteen months at his disposal, could not be expected to master the whole of anatomy, or to exercise any sound choice as to which parts of it he should neglect. They justly claim that after deciding how much they could leave out, their endeavour has been to lay stress, firstly on the technical methods of displaying the various structures successfully; and, secondly, on the position and relation of structures which experience shows are of practical importance." The aims thus set forth in the Preface have on the whole been adhered to, and the work is thus a distinct advance on some of the older manuals, in which structures such as the otic ganglion, or the fissures of the cerebellum were extensively treated, and matters of such vast importance as the course of the lymphatics of the tongue and breast, or the surface markings of abdominal viscera, received very scant notice, or were ignored altogether.

The directions for the dissector are explicit, and are a prominent feature of the work. This again stands in happy contrast with many manuals of Practical Anatomy, in which the directions are few, are in small print, and are hidden by pages of verbiage, the proper place for which is in the Text Book. The style is pointed and clear, and many facts are presented in a new and fascinating light. In place of the old-fashioned dissection from above, from below, and from the side, to display the pelvic fascia and its innumerable complications,

the authors have incurred a debt of gratitude from every medical student by denying its existence as a definite fascia, except on the inner side of the obturator internus muscle (parietal layer of pelvic fascia), and on the upper surface of the levator ani muscle, close to the os pubis (visceral layer of the pelvic fascia), the remainder being condensed cellular tissue, from which there is no difficulty in producing the orthodox arrangement by manipulation. This view the authors also hold with regard to the so-called deep cervical fascia. Thus they state that it does not form a definite sheath round the carotid artery, jugular vein, and vagus nerve, but that such a sheath is formed by manipulation from the cellular tissue surrounding these structures. A useful addition in the section devoted to the abdomen is the dissection to expose the kidney from behind. The illustrations are mostly diagrammatic, and are all original. For the most part they are not intended to illustrate the stage of the student's dissection, and thus the authors hope that a sense of topography may be acquired. The book is not entirely free from printers' errors ; in one or two places the omission of the necessary comma or semi-colon makes the author's meaning rather unintelligible. In their Preface the authors state that they do not consider the time yet ripe for the exclusive adoption of the revised nomenclature, and that they do not dare to send a student into the wards, believing that the radial nerve is a structure in the upper arm, when to his surgeon it is a structure in the forearm. The objects of the new nomenclature are only too frequently lost sight of. It is most important to realise that the Latin names are for international use only. Professor Krause, the editor of the *Basle Nomenclature*, asserts in stating the objects held in view by the commission, "Each nation using the Latin names can translate them in the way that seems best to it."

To alter the national nomenclature of anatomy is even more impracticable than the reformed spelling of Sir Isaac Pitman. For instance, we cannot expect the student to substitute for internal pterygoid plate of seven syllables—lamina medialis processus pterygoidei, which contains fifteen syllables, and it would be contrary to the objects of the International Commission to do so.

In conclusion, we heartily recommend this book to the notice of the student, and wish it the success it so thoroughly deserves.

Applied Anatomy of the Lungs and Pleural Membranes. By J. STUART DICKEY, M.D., B.Ch. Pp. viii, 127. Belfast: Alexander Mayne & Boyd. 1911.

A knowledge of the applied anatomy of the lungs and pleura is an essential preliminary to the study of physical

signs and the physical diagnosis of lung diseases. Unfortunately this is too often forgotten, and students are apt to think that they can enter upon the most difficult problems of physical diagnosis with the vaguest ideas as to the anatomy of the thoracic viscera, and especially of their relations to the chest wall. We might add that older practitioners also sometimes make mistakes in diagnosis from forgetfulness or ignorance of anatomical relations. This little book gives a very good account of the subject, and we think it will be found a valuable addition to the practitioner's bookshelf. It deals fully with the position and anatomical relations of the apices of the lungs, and of the relations of the clavicle to the lungs. The sections on the lymphatics and lymphatic glands of the pleura lungs and chest wall contain much valuable information, which it is of great practical importance to bear in mind. The descriptions of the pleural cavities and of the internal structures corresponding to certain surface landmarks are also very well put. There is a useful section on the routes of infection in pulmonary tuberculosis. Numerous figures of dissections and of sections of the thorax at different levels add to the value of the work. These figures are fifty in number, and are clear and well executed. We recommend this as a decidedly useful book, and an aid to accuracy in physical diagnosis of lung diseases.

Deformities, including Diseases of the Bones and Joints. By A. H. TUBBY, M.S., F.R.C.S. Second Edition. Two volumes. Pp. xxxi, 883; xxiv, 867. London: Macmillan and Co. Limited. 1912.

We most heartily welcome a new edition of Mr. Tubby's very valuable book on deformities, but very greatly regret that the author has adopted the plan of American writers on orthopædic surgery, and included in the new edition diseases of the bones and joints. The book is now published in two thick volumes, and the greater part of one of them is devoted to diseases of the bones and joints. We already have a most valuable book on diseases of the joints by Professor Howard Marsh, and an equally valuable one on tuberculous diseases of bones and joints by Sir Watson Cheyne, and there is therefore no need for inclusion of these subjects in Mr. Tubby's book. We do not think the portion of the book which deals with diseases of bones, other than tuberculous diseases, is at all adequate to the purpose, and had better have been omitted altogether; but the portion of the book dealing with tuberculous diseases of bones and joints, particularly the chapter on tuberculous disease of the spine, seems very complete. We notice reference to Mr. Harold Stiles's method of resecting a

portion of the diaphysis for tuberculous disease, and his illustrations are reproduced from Burghard's *System of Operative Surgery*. But all the chapters on diseases of bones and joints might well have been omitted. As well might aneurysm or varicose veins or any other disease of the limbs be included. If by orthopædic surgery we understand the surgery of deformities, that is quite a reasonable sub-division of surgery. It has been, we know, suggested that all diseases of the organs of locomotion should be included. If that is so, why has not Mr. Tubby a chapter on diseases of tendons and their sheaths, and of the peripheral nerves which innervate the muscles, and why does he include such a deformity as cervical rib? The only satisfactory sub-division of surgery as orthopædic surgery is to regard it as a sub-division dealing with deformities.

One great value of the new edition of Mr. Tubby's work is its inclusion of the very valuable information contained in the book by the author and Mr. Robert Jones on the surgery of paralysis, and this information is, of course, brought well up to date. The illustrations and reproductions of skiagrams throughout the work are excellent.

In a new edition of a work on deformities we are interested to note the author's recent views on the treatment of congenital dislocation of the hip and coxa vara. Mr. Tubby quotes the published results of various surgeons on the treatment of congenital dislocation of the hip by Lorenz's manipulative method, and refers to the rapid rise in the rate of successes to failures due to improvements in technique. He is still in favour of operation in cases in which manipulation fails, but not of the Hoffa-Lorenz operation of deepening the acetabulum, only in the open reposition of the head in what there is of an acetabulum. We know from experience that this may not be possible, even when the joint is freely opened.

In the treatment of coxa vara the author advises removal of weight-bearing through the limb, by the use of a Thomas caliper splint, and "if pain or spasm" are present he then recommends weight extension. If operation has to be undertaken he is in favour of Whitman's method of removal of a wedge from just below the great trochanter.

We are glad to see that the author, in describing the pathology of genu valgum, does admit that the tibia may be markedly deformed, but he does not seem to have yet examined a sufficient number of skiagrams to be convinced how often this is so, and in how many cases the curve in the tibia is the essential cause of the genu valgum. Hence we fail to find reference to the most reasonable method of its correction—osteotomy through the deformed bone. We do not agree with the author that adolescent genu valgum is generally due to a yielding of the internal lateral ligament, with secondary change

in the lower end of the femur, if bony change is present at all. We have seen many cases of adolescent genu valgum, with quite marked curve in the shaft of the tibia, and in some, but to a less degree, deformity in the lower end of the femur also, but have not come across cases due to stretched internal lateral ligament.

We turned with much interest to see what operative treatment the author recommended for congenital talipes equino-varus, as there is so much difference of opinion on the subject. We find he is not an advocate of Phelp's operation, but describes at considerable length the manipulation method of Lorenz and Wolff, which is really only manual wrenching. It seems as marvellous to us as it apparently did to Volkmann that severe cases can be corrected in this way, and we share the fear of those surgeons who think severe damage may be done to the foot if correction of the deformity is carried out at one operation.

This new edition of the book is, we think, the best work of any British surgeon on the subject, and must have involved much labour in its production. Indeed, Mr. Tubby tells us in his Preface that if he had fully appreciated the magnitude and difficulties of his task it is probable that his courage would have failed. It is fortunate for surgeons that he did not appreciate it, or we should have been without a very valuable and much enlarged edition of his book, which should be consulted by all who wish for full and recent information on the subject of deformities.

The Deaf Child: a Manual for Teachers and School Doctors. By JAMES KERR LOVE, M.D. Pp. vi, 192. Bristol: John Wright & Sons Ltd. 1911.

Much of this book is a reasoned appeal for a more scientific application of existing educational methods in the training of the deaf child and a clinical basis is laid down with that purpose in view. The art of teaching the deaf is not described in detail, but the basic principles upon which that art is founded are considered. The unreasonableness of attempting to teach all deaf children in institutions, whether by the "oral," the "manual," or the "combined method," regardless of the degree of deafness, the mental attributes, and the physical perfection of the child, is clearly shown. The author's attitude may be stated in his own words, quoted from p. 124: "I assert that further progress in the education of the deaf-mute depends not on the study of methods of education, but on a study of the deaf themselves, a study which will give a scientific classification, and which will enable existing methods to be applied with greater efficiency."

There are chapters on the history of the education of the deaf, the physiology of hearing, the causes and estimation of deafness, and the operation of the language centres of the brain in normal and abnormal children.

In another chapter the author describes in brief the various institutions for teaching the deaf which he has visited at home and abroad, and his visitations of this kind have been very numerous and thorough.

Examples are given of the wonderful attainments possible for the well-trained deaf-mute. It is shown that the deaf child, at the end of his school career, may be turned out a capable and self-supporting citizen.

We advise all school doctors and teachers of the deaf to read this very thoughtful and suggestive manual.

The Etiology, Diagnosis and Prophylaxis of Pulmonary Phthisis. By ALFRED HARRIS, M.B., Ch.B. Vict., D.P.H. Camb. Pp. 126. Bristol: John Wright & Sons Ltd. 1912.—This short treatise of 120 pages is somewhat slight for its comprehensive title. The historical survey in Section I and the following section on etiology contain many interesting facts in the form of references and quotations. The best part of the work is in Section IV on the "exciting cause," which deals with the morphology and other characteristics of the tubercle bacillus. The author makes the unqualified statement that " tubercle bacilli are not found in the urine of cases of phthisis, unless the bladder or other portion of the genito-urinary tract is affected." There is no doubt that bacilli can be found in the urine of many cases of phthisis which present no evidence of *clinical* genito-urinary tuberculosis. Flick and Walsh go so far as to say that fifty per cent. of phthisics have tuberculosis of the kidney, and that bacilli can be found in the urine of *all* cases of active pulmonary tubercle. Section VII. on prophylactic treatment is good. Attention is called to the danger from flies, and some interesting experiments are detailed. The appendices on sanatorium treatment and tuberculin treatment are too sketchy to be of much use. The writer is evidently well versed in the literature and history of tuberculosis, but the work contains little that is new, and we feel that the author would have made better use of his material had he employed it as the basis of some more ambitious work on the lines of a text-book.

On Bronchial Asthma: its Pathology and Treatment. By J. B. BERKHART, M.D. Revised and abridged Third Edition. Pp. vi, 150. London: Oxford University Press. 1911.—Seldom have we read a medical monograph with the sense of disappointment that the one before us has afforded. Not until

we reach p. 80 is the author's hypothesis as to the actual cause of the asthmatic attack revealed, viz. that asthma is a symptom of fibrinous bronchitis, of which latter a micro-organism is the cause, yet but scanty evidence in support of this view is advanced. The author seems more concerned to use hard terms than sound argument against the more prevalent theories. "To shake the sacred edifice of a bronchial spasm would naturally rouse the anger of the devout votaries at that shrine." "It is unnecessary to refer to a diagnosis of the alleged bronchial spasm . . . the attendant expiratory dyspnœa cannot be due to a bronchial spasm, as such hypothetical process would impede inspiration but facilitate expiration." One might forgive summary dismissal of widely-accepted theories if only the author gave us some grounds for throwing them aside and scientific argument in favour of his own, but he tells us "it is unnecessary at present to defend the view which I had adopted. A host of observers have since then declared in favour of the bacterial origin of acute bronchitis." The section on treatment is equally unsatisfying.

Studies in Pulmonary Tuberculosis. By FREDERICK GUY GRIFFITHS, M.D. Pp. iii, 113. London: Baillière, Tindall & Cox. 1911.—This work is an amplification of the prize thesis for the degree of Doctor of Medicine in the University of Sydney, and is founded on work done under the teaching of Dr. Camac Wilkinson. Chapter vii, on the specific treatment of pulmonary tuberculosis, speaks of the original method of Koch, elaborated by Wilkinson, which begins with small doses and progresses to larger ones, until the dose may become 60,000 times as large as the original dose; and Wilkinson maintains that it is only by enormous doses like these that one can hope to produce permanent effects. This book gives much evidence on the one side of the story, but the limitations of a potent drug like tuberculin are obvious, and it should be pushed to full doses only with caution and under close observation by one of experience and knowledge. We remember what harm was done by tuberculin given rashly in the early days, and this remembrance is now bearing fruit in a degree of caution, which is sometimes perhaps over-strained.

Consumption: Treatment at Home and Rules for Living. By H. WARREN CROWE, M.D. Pp. 36. Bristol: John Wright & Sons Ltd. 1912.—This third edition should be more useful than ever. In thirty-six pages the author gives a series of rules for self-management, which should be helpful to all whom it may concern. Rule 23 reads as follows: "At each meal eat as much as ever you can, then drink a pint of milk." This is a sample. The practice may not always be possible.

Health to Date. By W. T. FERNIE, M.D. Pp. xvi, 477. Bristol: John Wright & Sons Ltd. 1911.—Dr. Fernie in his preface speaks of this as his "Swan-Song," but we trust that in spite of the advanced years to which he confesses this may not prove his last venture in print. The sub-title, "The Modern Doctor; with Newer Methods of Cure," discloses the scope of the volume. All our new theories and plans of treatment come under the kindly-humorous criticism of Dr. Fernie; and strange enough is the figure cut by some of our modern fashions in physic, when the author out of the fulness of his experience and the rich store of his information parallels them with some ages-old crank or fad. Discursive, indeed, is his method, but always to some purpose. Old customs and apt quotations both old and new come in pat for illustration. "Meat eating," "Salt," "Standard bread," "Alcohol," "Open-air treatment," "Hygienic clothing," and many other homely topics are the foundations on which the gay superstructure is raised. We have grown very fond of Dr. Fernie and his entertaining books, and are very grateful to the house of Wright & Sons for discovering him.

Emergencies of General Practice. By PERCY SARGENT, M.B., B.C., and ALFRED E. RUSSELL, M.D., B.S. Second Edition. Pp. xi, 454. London: Oxford Medical Publications. [N.D.].—The object with which this book has been written—to bring together "in a concise form for easy reference certain acute and urgent conditions which require prompt recognition and treatment"—has been well attained. The practitioner consulting its pages may rely upon finding practical methods of diagnosis and treatment for all the medical and surgical emergencies he is likely to meet with succinctly described. In this second edition a chapter on the Emergencies of Insanity, by Dr. Percy Smith, has been added, and other chapters have been almost wholly re-written or re-arranged, and the whole work carefully revised.

Lateral Curvature of the Spine and Flat-foot. By J. S. KELLETT SMITH, F.R.C.S. Pp. xii, 137. Bristol: John Wright & Sons Ltd. 1911.—This is a useful little book which deals with the nature of scoliosis and flat-foot and their treatment. The treatment of the extreme cases of scoliosis is not considered, but the treatment of the lesser degrees by various forms of exercises is fully described, and there are numerous and very helpful illustrations. Exercises, both active and passive, are discussed for the treatment of flat-foot, and directions are given for special construction of boots to overcome the deformity. This part of the book is also well illustrated. The book must not be regarded as a complete account of either scoliosis or flat-foot, for the methods of dealing with the worst forms of flat-foot

are not referred to, but it seems to us a useful guide to treatment of the less severe forms both of scoliosis and flat-foot.

The Bradshaw Lecture, December, 1911. By R. CLEMENT LUCAS, B.S., M.B., F.R.C.S. Pp. 50. London: Adlard and Son. 1912.—The subject of this lecture on some points in heredity sounds the parting knell of the word *diathesis*, and gives some interesting illustrations on the Mendelian and Weismannian views on various questions in eugenics. The discovery of the fact that exposure to the X-rays destroys the reproductive function of the generative organs should be of great use in dealing with the problems of the feeble-minded and the survival of the fittest.

Clinical Methods. By ROBERT HUTCHISON, M.D., and HARRY RAINY, M.D. Fifth Edition. London: Cassell and Co. Limited. 1912.—To the casual observer this volume, which now reaches its fifth edition, appears small and easily compassed. However, the memories of a misspent youth teach otherwise. The reviewer has the liveliest recollection of his struggles with the book at the outset of a clinical clerkship, which has now faded into the historic past. In fact, criticism of such a work seems to savour of impiety. The book has become an abiding institution, hallowed by long usage, and no student can afford to be without it during those woeful months when he is wrestling with the elements of physical diagnosis. There is such an enormous mass of information crammed into 600 pages that the reader will find it well to use it as a work of reference after he has gone straight through it once. A certain amount of the subject-matter might perhaps have been left out to make room for more recent methods. There is, for instance, nothing said about the use of the X-rays in diagnosis, and we think the existence of such methods as cystoscopy and bronchoscopy should at least be mentioned. The section which deals with pulse tracings might be made more concise and at the same time more modern. In bringing their book up to date in this fifth edition the authors have invoked the help of several distinguished colleagues, and we trust that this may be taken as evidence of a resolve to keep the book alive and modern by constant revision. Compact, comprehensive, and "level-headed," this volume is indispensable, and not likely to be superseded in the affections of the student.

The Educational Treatment of Stammering Children. By THOMAS J. T. MCHATTIE, M.D. Pp. 18. London: J. and A. Churchill. 1911.—In this pamphlet, issued by the Medical Officers of Schools Association, Dr. McHattie is an advocate of the psychotherapeutic treatment of stammering, but he would also combine with this the use of deep breathing exercises and lessons in proper voice production. His advice as to the best

methods of restoring the self-confidence which is so lacking in the stammerer will well repay study. Some of the most valuable suggestions made in the discussion before the Medical Officers of Schools Association are those of Mr. Cortlandt MacMahon, who dealt with the teaching of classes of stammering children. The institution of centres for this purpose in our large cities is much needed.

The Therapy of Syphilis. By Dr. PAUL MÜLZER, Translated by A. NEWBOLD. Pp. xv, 248. London: Rebman Ltd. [N.D.] —This account of the administration of the arsenic compounds, and particularly dioxydiamidoarsenobenzol ("606"), was written in 1910, and the English translation appears somewhat belated. Many observations have been made and published since 1910 which have tended to modify our views of this drug, and to shake our faith in it as the "Therapia sterilisans magna." The book belongs to the period of early enthusiasms, when the possibility of a single injection of "606" curing syphilis was still not disproved. It is well written, well translated, and excellently printed; but the drug has not fulfilled the expectations expressed by the author. For this he must not be blamed. "We do but learn to-day what our better advanced judgments will unteach us to-morrow." Dr. Paul Mulzer's book has helped our judgment to advance.

The Care of Infants and Young Children. By H. DINGWALL FORDYCE, M.D. Pp. viii, 158. Edinburgh: E. & S. Livingstone. 1911.—This book deals with the baby in health and disease, and is intended by the author as a guide for mothers, nurses, health visitors and students of medicine. We think that it should be most useful for practitioners also, for it contains many commonsense points in the diet, hygiene, etc., of the child which it is quite impossible to glean from ordinary text-books, and can only be obtained by close observation of the ways and peculiarities of children. In a book of the scope of this one it is only natural that one should find statements with which one cannot agree. The author's condemnation of barley water in the diet of a child seems rather drastic, seeing its frequent use in children's hospitals; also the advice that the child should not be taken out for some weeks after birth seems an unnecessary precaution. The chapter on peculiarities of disease and disorders of digestion in children are particularly good, and his plea for health visitors will be endorsed by many who have seen the same baby again and again in the hospital as a result of the mother not understanding the most elementary principles of feeding. We can heartily recommend the book to those interested in the care of infants and young children.

Treatment of Tuberculosis and Lupus with Allyl Sulphide. By WM. C. MINCHIN, M.D. Pp. xi, 88. London: Baillière,

Tindall & Cox. 1912.—Allyl sulphide is the essential oil of garlic, and it has figured in most of the old herbals as a useful remedy, whether taken internally or externally applied, for affections of the chest, as a diuretic, and also as a prophylactic against plague and poisoned wounds including the venom of snakes and dog-bites. Several papers have appeared in recent times concerned with its antiseptic properties, as also with its rapid absorption and excretion by the body. It is the object of this brochure to direct attention to its specificity in tuberculosis, and to suggest methods by which this forgotten herb may be administered with advantage. If it is true, as Dr. Minchin asserts, that "operations for advanced tuberculous disease in accessible situations, *e.g.* amputations of the leg, foot, arm, hand, castration and such-like" are rendered unnecessary by the use of garlic applied as a cataplasm or inhaled from a mask, who is there but would submit to all the evils of the ghetto rather than be dismembered? While if "its peculiar penetrating power and volatile nature makes inhalation quite effective in pulmonary tuberculosis" and in laryngeal phthisis, the "uttering of such a deal of stinking breath" would be forgiven. The writer claims that lupus will yield to applications of the juice, and holds that this treatment has no rivals in the successful management of such cases. These are big claims that he puts forward, and they are capable of proof. If the profession after trial agree with those who have written to Dr. Minchin testifying to the good results that they have obtained or witnessed, it will be under a great obligation to the writer of this little book for reintroducing a cheap, though nasty, cure for the great white plague in its protean forms.

Dental Anæsthetics. By WILFRED E. ALDERSON, M.D., M.S. Pp. viii. 100. Bristol: John Wright & Sons Ltd. 1911.—Although the various branches of medicine have long since been divided up again and again into sub-divisions of specialization, it is questionable whether the title suggested by this book serves a very useful purpose. The phenomena of respiratory anæsthesia is just the same whether it be for dental extraction or removal of ingrowing toe-nail. We think the book, therefore, would have had a wider scope had it been styled "A handbook of anæsthetics for medical and dental students." But while criticising the title of the work, we must congratulate the writer on the lucidity and style of the subject-matter, as well as the arrangement of chapters and the concise way of dealing with anæsthetic administration in its various forms. In glancing through the pages of this little volume just one error—possibly a printer's—strikes the eye. On page 19 the tabulation at the foot of the page should be lettered not numbered, as the last line indicates. We think, in conclusion, that it is just one of those handbooks that every medical as well as dental student

ought to have, and its price brings it well within the range of even a modest purse.

The Prevention of Dental Caries and Oral Sepsis. By H. P. PICKERILL, M.D., M.D.S., L.D.S. Pp. xvi, 308. London: Baillière, Tindall and Cox. 1912.—This is practically the Cartwright Prize Essay of the Royal College of Surgeons for 1909–10. The author was a distinguished student of Birmingham University, and is now the Director of the Dental School at Otago University. It is the record of most original work, leading to most original conclusions. It is not too much to say that if the author's conclusions are correct, and at present we fail to see flaws in the reasoning, we must modify our views on many points. "Modify" is too weak a word, we must start afresh. The abolition of dental caries seems not merely on the horizon, but is apparently in one's grasp. It is a most brilliant essay, and we intend to read it again at leisure.

Diseases of the Skin. By Sir MALCOLM MORRIS, K.C.V.O. Fifth Edition, Revised by the Author, with the assistance of S. Ernest Dore, M.D., M.R.C.P. Pp. xv, 762. London: Cassell & Co. 1911.—The five editions through which Sir Malcolm Morris's book has passed since 1893 are sufficient proof of its value and popularity. The gradual addition of new illustrations with successive editions has greatly improved the work. In the treatment of syphilis due consideration is given to the newer methods of arsenical injections and to the serviceability and limitations of the Wassermann test. Ringworm and fungus diseases are dealt with afresh in the light of modern research. Radium-therapy, serum-therapy, vaccine-therapy, and the use of carbon dioxide snow are some of the new subjects introduced. More diseases are recognised as having microbic origins than formerly. In fact, such changes have come into the book that we begin to question whether it is wise to continue bringing out new editions rather than to scrap the old hull, and launch a new design. Many another excellent text-book has suffered from the multiplying of editions. The printing and publishing are of the usual high quality that we look for from the "Belle Sauvage" yard.

Index-Catalogue of the Library of the Surgeon-General's Office, United States Army. Second Series. Vol. XVI. Skinko—Stysanus. Pp. 882. Washington, 1911.—The present volume contains 9,890 author titles, 3,892 subject titles of separate books and pamphlets, and 24,135 titles of articles in periodicals. Under "Spinal" and "Spine" there are no less than 123 pages of closely-printed references, and 189 pages are similarly devoted to "Stomach." Such statements show the incalculable worth of such a work to those interested in medical literature, and provide an eloquent testimony to the painstaking care with which the compilers have carried out their arduous task.

Editorial Note.

The Whole-Time Tuberculosis Officer

It is much to be regretted that the attention of the profession has been so concentrated upon the medical benefit sections of the Insurance scheme that its Sanatorium benefit clauses have been, comparatively speaking, ignored. Had it been subjected to more criticism, we feel sure that the whole-time officer would have been statutorily limited to his sphere of real usefulness, that of administration. Even the short and restricted criticism which has been brought to bear upon the matter has made a good deal of difference in this direction. At first the whole-time officer was destined to undertake wide responsibilities in the diagnosis and treatment of tuberculosis; now, however, we find from the latest order of the Local Government Board, that he is not to carry out domiciliary treatment at all except through a rather absurdly stereotyped series of printed forms, which the general practitioner treating the patient is to fill up and forward periodically to the whole-time officer. We are convinced that sooner or later this evolution of the whole-time officer will be carried to its logical conclusion, limitation to administrative work by the pressure of natural forces.

Specialism is an unfortunate necessity in certain territories of medicine, but tuberculosis, with its incidence on all sorts and conditions of organs and tissues, cannot be mapped out like one of these. The best clinical unit for the struggle with tuberculosis in all its forms is an efficient general practitioner, with a group of consultants within reach; and if special training in the diagnosis of pulmonary tuberculosis were insisted on in the education of every medical student, it would repeat on the wholesale scale all the good which is obtained in a sporadic form from the now popular pilgrimage to Edinburgh.

But the " tuberculosis specialist " is likely to prove injurious as well as unnecessary. He is to be paid to find tuberculosis, and he will have to justify his existence by presenting turgid masses of statistics to his committee. Small wonder if cases which would be " doubtful " and " negative " to a less prejudiced observer are written down by him as " positive," regardless of the miserable anxiety to patient and friends which is the inevitable result. It is, therefore, clearly in the public interest that no notification of tuberculosis be made by the whole-time officer which has not been ratified by some other medical man. The real onus of early diagnosis must always fall on the general practitioner. He alone knows the make-up and the surroundings of the patient; it is to him that the tuberculous person will turn at first, feeling ill but not knowing why; and an army of well-taught family doctors can carry on a far wider campaign of examination of contacts than can be attempted by a group of officials.

The position of the whole-time officer, then, is this. Direct responsibility for treatment has already been taken away from him by the Local Government Board, while he is disqualified for early diagnosis by the immensity and the intimacy of the task. What excuse remains for his existence? We think he will have a real administrative value; it will be an advantage to incorporate in one officer a knowledge both of the demand for institutional and other treatment, and of the supply available at any given moment. No doubt also the medical officer of health, whose assistant he will be, will find uses for him. It is, therefore, to an administrative and not to a clinical career that the aspiring tuberculosis officer should look forward, for the clinical path which now appears to furnish so promising an opening is in reality a blind alley. It should never be forgotten that the Departmental Committee, whose interim report forms the basis of the Government scheme, was practically composed of medical officers of health, with one or two consumption specialists and no general practitioner, and the product of their deliberations is, not unnaturally, an assistant to the medical officer of health. This is the proper *métier* of

the whole-time tuberculosis officer, and he should be limited to it. Whether the public will enjoy paying salaries to assistant medical officers of health is doubtful, but at any rate it is not our affair.

Notes on Preparations for the Sick.

"Laibose." A concentrated food prepared from whole wheat and the solids of milk, to be taken with water as desired.—FAIRCHILD BROS. & FOSTER, New York. Agents: BURROUGHS, WELLCOME & Co., London.—The analytical reports issued with this preparation gives the protein content as 18 per cent., fat 17 per cent., carbohydrate 55 per cent. mineral ash 4 per cent.

Our examination showed the presence of those constituents which are always present in a food prepared from milk and wheat, and a certain proportion of starch was detected. A small portion of the food is soluble in water, but rather less than is usually the case.

"Kerol."—QUIBELL BROTHERS LTD., Newark.—This is a name given to a series of disinfectant preparations which are now being much advertised. The bactericidal value of "Kerol" has been tested by reliable authorities using modern methods, and found quite satisfactory.

Judging from our analysis, "Kerol" is a tar product containing an emulsifying agent which enables it to mix quite readily with water, the resultant emulsion being fairly stable. Carbolic acid was not detected, and the reactions obtained indicate the presence of the higher congeners of phenol, which are less toxic but equally valuable as germicides.

"Glaxo."—BRAND & Co., Vauxhall, S.W.—"Glaxo" is a starch-free infant's food, prepared by the old and reliable firm of Brand & Co. A notable feature is that the preparation is put on the market in hermetically-sealed tins, which is a most important point.

The food forms a milk-like emulsion, which we found to be rich in proteid. Soluble carbohydrate was present, but no starch was detected. It is one of the best milk foods that has come under our observation.

Levico Water.—Imported by HERTZ & Co., 9 Mincing Lane, London, E.C.—Levico Waters come from two springs situated near the town of Levico, in the Tyrol. One of the springs yields a strong, the other a mild water. We have examined a specimen of the former, and found it to be a genuine ferruginous mineral water. It possesses a distinctly astringent taste, and a faintly acid reaction.

The main constituent is ferrous sulphate, and small amounts of arsenic were detected, which enhance its tonic properties. We consider that ferrous iron possesses more valuable medicinal qualities than ferric compounds, and those taking this water can rely on a good proportion of the former combination being present.

"Hyposol" Ampoule-Syringe.—ALLEN & HANBURY'S LTD., London.—This combination supplies a sterile, solution, syringe and needle, always ready for immediate use. The ampoule becomes the barrel of the syringe, a piston rod being fitted on the one end and a finger-grip with needle at the other. The plunger is of pure cellulose, and fits the barrel perfectly. Sterilised needles are supplied, each enclosed in a sterile glass sheath.

The "Hyposol" can be supplied charged with any required solution up to 2 c.c. for subcutaneous, intra-muscular, or intra-spinal injections.

The ease with which the "Hyposol" is converted into a rigidly aseptic hypodermic syringe charged with a sterile solution is apparent, and its convenience as a substitute for the ordinary hypodermic syringe will easily be realised. For the complete success of the new method it is necessary that its cost should not appreciably exceed that of the old.

The expense of frequently renewing fragile syringes is not inconsiderable, and if this be taken into account, with the saving of time and the undoubted convenience, the extra cost

per " Hyposol " above that of the ordinary ampoule is not considerable.

For insoluble mercurials, and other substances in suspension, the " Hyposol " method of administration is ideal.

Malt Extract (crystalline) with Iron Iodide.—A. WANDER LTD., 1–3 Leonard Street, London, E.C.—This is not a new preparation, but one which has been well tried. It is found that the mild laxative action of the malt extract corrects the constipating tendency of the iron, and that its action combines the properties of its components in a very efficient manner. The taste of the ferrous iodide is well disguised, and the combination is in every way an acceptable one.

Glycerole Lecithin—Fairchild.—BURROUGHS, WELLCOME & Co., London.—This solution of Lecithin contains 1 grain in each teaspoonful dose ; the disagreeable properties of the drug have been successfully disguised, and the Lecithin in solution is not coagulated by boiling or precipitated by alcohol. A dose contains gr. $\frac{1}{25}$ of actual phosphorus in its organic combination. In cases of cerebral exhaustion and the various forms of neurasthenia, as well as in many conditions of general malnutrition, this metabolic stimulant is well worthy of a prolonged trial.

"Balmosa."—OPPENHEIMER, SON & CO., London.—"Balmosa" is an analgesic, antiseptic, snow-like cream, containing methyl salicylate with rubifacients in an ideal non-greasy basis which promotes the rapid absorption of the medicament. This basis forms a good lubricant for rubbing and will not irritate the skin or soil the clothing. Methyl salicylate, when rubbed into the skin, is rapidly absorbed, and exhibits the usual effects of the salicylates, but without disturbing digestion and with the added advantage that it can be applied in the neighbourhood of the pain.

Palatinoid Caryophylli Pulv. gr. v—Keratine coated.—OPPENHEIMER, SON & CO., London.—The therapeutic effects of cloves are chiefly due to the volatile oil present, but it is a fact that for internal use the powdered drug gives better results than the isolated oil. This may be due chiefly to mechanical causes, *e.g.* presence of fibre delaying absorption, but it is probable the other constituents—not present in the oil—also exert some action, hence the freshly-powdered drug is preferable for internal use, and it is best given in " Palatinoid " form,

which preserves the volatile constituents perfectly, and the keratine coating, resisting solution by the gastric juice, permits the drug to pass the stomach unchanged, but is dissolved in the alkaline fluid in the intestines, thus liberating the contents where they can exert a maximum therapeutic effect.

Sapo Antisepticus Etherius, containing hyd. iodid. rub. 1 in 1,000. **Elixir pro Pertussi,** phenazonum, tolu and glycerine. **Vaginal Douche Tablets,** alum, zinc, sulpho-carbolat, etc. **Flexible Gelatine Capsules,** many varieties, *vide* list. **Asensitine,** a sterilised and antiseptic hypodermic solution of tropocain, 1 per cent. for dental anæsthesia.—DUNCAN, FLOCKHART & Co., Edinburgh.

These preparations are all the best of their kind, and their utility is obvious.

Unguentum "Iothion," Bayer.—THE BAYER Co., London.—A non-staining iodine ointment, containing 10 per cent. of "Iothion" (equivalent to 8 per cent. of iodine); is not combined with any alkali, but is prepared with a water-free ointment base. It has a slight yellow colour, with very little odour; it diffuses easily, and should obviously be most useful for any form of external treatment by iodine. It should be applied to the unbroken skin only once or twice daily, when its absorption through the skin may readily be demonstrated by the presence of iodine in the urine. Its utility is especially obvious in the reduction of swollen glands and the disappearance of parasitic affections of the skin.

Hydrastinin - hydrochlor, Bayer. — In tablets containing the synthetic drug. Each contains 0.025 gramme (approx. $\frac{2}{5}$ grain). One tablet should be swallowed three or four times a day when this drug is indicated.

Pituitary Extract: Vaporole.—BURROUGHS, WELLCOME & Co., London.—Each phial contains 0.5 c.c. of a sterile extract made from the posterior lobe of the pituitary gland.

This product has the power of causing unstriped muscle to contract. It has proved especially useful in arresting the fall of blood-pressure in the condition of shock following surgical procedures. When injected into muscle the effect on the blood pressure is not noticeable until twenty or thirty minutes have elapsed, but an immediate result follows injection into a vein. In cases of shock the most convenient and efficient method of administering the extract is by adding it to normal saline solution, and transfusing intravenously with this mixture.

Its effect upon unstriped muscle is well seen in the action

of the drug upon the uterus, for which reason it is now extensively used as a substitute for ergot.

Its action upon the intestinal muscles seems to be less constant, and more experience is required before one can confidently select cases favourable for its employment in intestinal paresis.

We have seen no ill effects following its use.

The Library of the Bristol Medico-Chirurgical Society.

The following donations have been received since the publication of the List in June:

August 31*st*, 1912.

L. M. Griffiths (1) .. .. 2 volumes.
The Editor of *The Medical Officer* (2) .. .. 1 volume.
John Wright & Sons Ltd. (3) .. .. .. 5 volumes.
Unbound periodicals have been presented by Messrs. John Wright & Sons Ltd.

EIGHTY-FIFTH LIST OF BOOKS.

Titles of books mentioned in previous lists are not repeated.

The figures in brackets refer to the figures after the names of the donors, and show by whom the volumes were presented. The books to which no such figures are attached have either been bought from the Library Fund or received through the *Journal*.

Adams, P. H.... .. *Pathology of the Eye* 1912
Adamson, H. G. .. *Modern Views upon the Significance of Skin Eruptions* 1912
Barclay, W. J. S. Bythell and A. E. *X-ray Diagnosis and Treatment* 1912
Brockbank, E. M... *Children: Their Care and Management* .. 1912
Bruce and W. J. Dilling, J. M. *Materia Medica and Therapeutics.* 9th Ed. 1912
Brühl, G. .. .. *Atlas and Epitome of Otology.* (Ed. by S. M. Smith) 1902
Bythell and A. E. Barclay, W. J. S. *X-ray Diagnosis and Treatment* 1912
Cunningham, D. J. *Manual of Practical Anatomy.* (Ed. by A. Robinson.) Vol. I. .. .. 5th Ed. 1912
Dilling, J. M. Bruce and W. J. *Materia Medica and Therapeutics.* 9th Ed. 1912

Dixon, A. F. .. .. *Human Osteology* 1912
English, A. Latham and T. C. [Eds.] *A System of Treatment.* 4 vols. 1912
Fortescue-Brickdale, E. W. H. Groves and J. M. *Text-Book for Nurses* 1912
Granville, A. B. .. *The Spas of Germany* .. .. (1) 2nd Ed. 1839
Groves and J. M. Fortescue-Brickdale, E. W. H. *Text-Book for Nurses* 1912
Herringham, W. P. *Kidney Diseases* 1912
Knocker, D. .. .. *Accidents in their Medico-Legal Aspect* 1910
Kraepelin, E. .. *Clinical Psychiatry.* (Ed. by T. Johnstone) 1904
Latham and T. C. English, A. [Eds.] *A System of Treatment.* 4 vols. 1912
Lewers, A. H. N... *Diseases of Women* .. .. 7th Ed. 1912
Marie, A. [Ed.] .. *Traité international de Psychologie pathologique.* .. .. Tom. III 1912
Miles, A. Thomson and A. *Manual of Surgery* .. .. Vol. III 1912
Murphy, D'A. Power and J. K. [Eds.] *A System of Syphilis.* Vols. IV–VI 1910
Oettingen, W. v. .. *Leitfaden der praktischen Kriegs-chirurgie* .. 1912
Phillips, S. .. .. *Social Work in Hospitals* 1912
Pickerill, H. P. .. *Stomatology in General Practice* 1912
Power and J. K. Murphy, D'A. [Eds.] *A System of Syphilis.* Vols. IV–VI 1910
Savage, W. G. .. *Milk and the Public Health* 1912
Short, A. R. .. .. *The New Physiology in Surgical and General Practice* .. .. 2nd Ed. 1912
Sibley, W. K. .. *The Treatment of Diseases of the Skin* 1912
Thomson and A. Miles, A. *Manual of Surgery* .. .. Vol. III 1912
Thomson, H. H. .. *Consumption in General Practice* 1912
Wallis, Sir F. .. *Surgery of the Rectum* 1912
Walsh, D. .. .. *Golden Rules of Skin Practice* .. 4th Ed. [1912]
Watson, C. .. .. *Food and Feeding in Health and Disease* .. 1910

TRANSACTIONS, REPORTS, JOURNALS, &c.

American Journal of Ophthalmology, The .. .. Vol. XXVIII 1911
American Journal of Surgery .. .. Vol. XXV 1911
American Medicine .. .. N.S., Vol. VI 1911
American Pediatric Society, Transactions of the .. Vol. XXIII 1911
American Association of Obstetricians and Gynecologists, Transactions of the .. .. Vol. XXIV 1911
American Urological Association, Transactions of the .. Vol. V 1911
Annals of Tropical Medicine .. .. Vol. V 1911–12
Archiv für Gynækologie .. .. Bd. LXXXIX 1909
Archiv für klinische Chirurgie .. .. Bd. XCVI 1911
Archives of Surgery .. .. Vol. XI 1900
Beiträge zur klinischen Chirurgie (3) Bds. LIX, LX, 1908; LXV–LXVII 1910

Bristol Health Report for 1910		1911
Bristol Medico-Chirurgical Journal, The	Vols. XXVIII, XXIX	1910–11
Bristol Port Sanitary District: Annual Report of Medical Officer of Health		1911
Bulletin de l'Académie de Médecine	Bds. LXV, LXVI	1911
Bulletin de l'Académie royale de Médecine de Belgique	Tom. XXV	1911
Bulletin de la Société française de Dermatologie		1911
Deutsche Zeitschrift für Chirurgie	Bd. CXII	1911
Hospitals and Charities, Burdett's		1912
Journal of Hygiene, The	Vol. XI	1911
Journal of Medical Research, The	Vol. XXV	1911–12
Journal of Mental Science, The	Vol. XLIV	1898
Journal of Obstetrics and Gynæcology of the British Empire	Vol. XX	1911
Journal of Tropical Medicine, The	Vol. XIV	1911
Library Association Record, The	Vol. XIII	1911
Library World, The	Vol. XIII	1911
Library, The	3rd Series, Vol. II	1911
Medical Officer, The	(2) Vols. V, VI	1911
Münchener medizinische Wochenschrift	Bd. II for	1911
New York Obstetrical Society, Transactions of the		1909–11
Nordiskt Medicinskt Arkiv.	Bds. XLIII, XLIV	1910–11
Parasitology	Vol. IV	1911
Philippine Journal of Science, The	Vols. IV, V	1909–10
Privy Council, Report of the Medical Officer of the	(1) 10th, 1868; N.S., No. 3	1874
Progressive Medicine	Vol. I	1912
Revue de Chirurgie	Tom. XLIV	1911
West London Medical Journal	Vol. XVI	1911

MEETINGS OF SOCIETIES.

Bristol Medico-Chirurgical Society.

April 10th, 1912.

Mr. C. A. MORTON, President, in the Chair.

Dr. J. ODERY SYMES opened a discussion on **The diagnosis of the causes of chronic recurrent abdominal pain.** The causes of chronic and recurrent abdominal pain are so numerous that time will only permit to mention many of them, passing on then to the consideration of those presenting the greater difficulties. The headings of his address are as follows:—

(1) *Stomach, duodenum, and intestinal appendix.*
Functional. Obstructive.
Inflammatory. Malposition.
Ulcerative.

(2) *Pancreas and liver and gall-bladder.*
Inflammatory.
Calculi.
Tumour.

(3) *Renal.*

Aneurysm of aorta or mesenteric arteries, diseases of spinal column, cord and membranes (tabes, caries, psoas abscess), lead colic, hysteria, neurasthenia, and diseases of the pelvic organs.

Dr. WALTER SWAYNE dealt with the incidence and symptomatic value of abdominal pain in **diseases of the female generative organs.** He called attention to the localisation of the different pathological conditions by the pain to which they gave rise, and to the way in which inflammation of the appendix on the right side was apt to be associated with inflammatory affections of the right appendages, while on the left diseases of the sigmoid might lead to mistaken diagnosis of disease of the left ovary and tube. He alluded to the fact that uterine displacements, especially retroversion of the uterus, might give rise to pain in the hypogastrium. He also pointed out how in ovarian tumours and fibroid tumours of the uterus abdominal pain was an important indication of such accidents as twisted pedicles in the one and degeneration in the other. The occurrence of abdominal pain in pelvic inflammation was also alluded to, and its special characteristics described. The characteristics of the abdominal pain due to ectopic gestation were also noticed, and attention drawn to its sudden onset and engravement character. The characters of the pain produced in pregnancy by what is probably rheumatic myositis were also dealt with, and it was shown that acute abdominal pain during pregnancy, constant in type and without febrile symptoms, was extremely rare, except as the concomitant of some gross pathological lesion, such as tumour of the gravid uterus of or the pedicle of an ovarian tumour existing with pregnancy, or of concealed accidental hemorrhage. The pain due to carcinoma of the body of the uterus was also alluded to, as well as to the acute pain produced by a stone in the ureter, which might be mistaken for oöphoritis.

Dr. RUPERT WATERHOUSE referred to the condition known as appendix dyspepsia, of which he had seen two cases in young girls. There was pain and vomiting after food, but laparotomy revealed

appendical adhesions and concretions to be the probable cause. He thought surgeons were apt to overlook the gastric crises of tabes and lead poisoning as causes of abdominal pain. He had, however, seen cases in which gastric ulcer had followed lead colic, and in one case of the kind, with perforated gastric ulcer, an operation was not performed, because the patient was known to have suffered from lead colic. The speaker had no belief in the "moral effect" of operation in hysteria, and considered operation should be avoided in abdominal hysteria. He thought the signs and symptoms of that form of abdominal trouble were not sufficiently taught. The patients were frequently alert, vivacious women, and complained of stomach pain and vomiting. There was no rigidity and no hyperalgesia. Deep pressure into subjacent structures elicited pain, which seemed to lie along the aorta and iliac vessels.—Mr. CARWARDINE referred to the surgical causes of abdominal pain, and gave the following classification: (1) Colics of internal origin, (2) mesenteric and omental twists, (3) inflammation of organs, when the inflammation spread to the peritoneum, (4) impaction of viscera, (5) thrombosis and embolism of vessels. He pointed out that the organs themselves are generally painless, but that the mesenteric attachments and parietal and visceral peritoneum are susceptible to pain. Referred pains cannot be associated with any particular organ unless at some time or other that organ is tender. Conversely, for accurate diagnosis, the local tenderness should correspond with definite referred pains. The application of the foregoing to specific instances was then detailed. Gastric ulcer may be present without pain. The so-called "hunger pain" is associated with lesions in the right hypochondrium involving the peritoneum, not alone with duodenal ulcer. The pain of gall-stones, renal mobility and calculus, appendicitis, intestinal colic, twisted ovarian pedicles, etc., was discussed on the same lines.—Dr. MICHELL CLARKE said that if severe abdominal pain and tenderness were present the cause was something more than dyspepsia. In obscure cases of pain a "lead line" should be looked for and the knee-jerks tested. A patient with chronic recurrent abdominal pain gradually becomes neurotic. Mucous colitis as a cause of pain had to be remembered, also abdominal pain due to chest conditions, *e.g.* unresolved pneumonia.—Dr. JAMES SWAIN thought the subject too large to admit of a full discussion of the many causes of chronic and recurrent abdominal pain, which had been so well classified by Dr. Symes. He agreed that the most common causes of such pain were usually found in association with the appendix, kidney and gall-bladder. These, however, rarely presented any difficulty. The tenderness at McBurney's point in the case of the appendix, the reflection of the pain along the last dorsal, ilio-inguinal and ilio-hypogastric nerves

in affections of the kidney, and the sub-costal tenderness in the case of the gall-bladder, were very helpful in diagnosis in these several conditions. Many cases of chronic and recurrent pain were due to some form of intestinal adhesions, and here a history of former peritonitis—tuberculous or simple—of hernia, operation, or appendicitis would aid us in coming to a conclusion as regards the probable origin of the trouble. Mucous colitis must also be thought of, and he (the speaker) had occasionally been consulted in such cases with a view to operation for supposed disease of the appendix. An examination of the stools would prevent error. There was one class of case to which reference had not been made, namely simple colic, which is often very difficult to differentiate from intestinal adhesions or malignant growth. He had seen many cases where the recurrent pain, constipation, abdominal distension, and even wasting and occasional vomiting, which may occur in cases of colic, caused great difficulty in arriving at an accurate diagnosis. The occurrence of occult blood in the fæces would be suggestive of an ulcer either simple or malignant, but he was not inclined to give much weight to the fact of retardation of a bismuth meal as an aid to the diagnosis of obstruction from malignant growth. Many cases of simple colic could only be diagnosed from malignant disease by carefully watching the patient in bed. If in spite of the relief of constipation and careful dieting, the patient steadily lost weight the abdomen should be explored, when an early malignant neoplasm would probably be found; but if improvement took place under these conditions, the case would probably be one of simple colic, and we could justifiably avoid surgical interference.—Mr. BRASHER agreed that a thorough exploration in obscure cases should be made by laparotomy, but opposed the advice to use a transverse incision.

Obituary.

WILLIAM FREDERICK BAILEY EADON, L.R.C.P., L.R.C.S. Edin.

DR. EADON, when he first came to Hambrook, was assistant to Dr. Day, later he became partner, and for the last thirty years has carried on the practice by himself.

His practice was a very extensive one, both as regards the number of patients and the distances travelled. At first he used horses to get about, but later he did all his work on an

ordinary bicycle, often covering over fifty miles a day. For the last seven or eight years he had used a heavy-weight motor bicycle, far too heavy for a man of his physique. He rode this machine in all weathers, getting wet and covered with mud. One very wet day he called upon a patient of his, and they had a new servant who did not know the doctor. As they were expecting coal, the maid when he came to the front door told him to please take it round the back. He quite enjoyed the joke, and related it when he got to the bedroom of the patient. His practice was a very varied one. He had a large number of club patients, and also attended many of the best people in the district.

He never took a holiday. A patient once asked him why. He replied : " I do not feel I want one, and I am quite happy in my practice." He had no hobby, his whole heart was in his practice. He was an indefatigable worker, and never seemed happy unless he was busy.

He was held in very high esteem professionally, and people travelled long distances to get his opinion on their individual cases. Not only was he thought a great deal of in his professional capacity, but I have often heard people say they loved the little doctor. He was a good all-round general practitioner, and good to the poor people of the neighbourhood. He will be very much missed in this district.

Many years ago he was thrown from his trap ; except for this he was never ill enough to prevent him from doing his work.

In November, 1911, whilst in his surgery, he was seized with a fit, and was temporarily unconscious. He thought the attack was epileptic, but most probably it was due to slight cerebral hemorrhage. He stayed indoors a few days, but against advice he insisted on going out at the end of a week on his motor bicycle. Except for a few attacks of temporary hemianopsia, he continued fairly well until February of this year, and although it was pointed out to him how dangerous it was for him to ride, he would continue to do so.

In February, after having a lot of trouble with his motor bicycle, involving a good deal of stooping, he mounted his ordinary bicycle after a heavy morning surgery, and hurried to make up for lost time. He had another seizure whilst riding the bicycle, fell, cut his head, and was unconscious for some hours. When he recovered consciousness he had absolute homonymous hemianopsia in the right field of vision. After many weeks he got well enough (as he thought) to go out in his motor car and see a few patients ; but he only did so for a few days before having another attack. After this he had several attacks, and became hemiplegic. The last few days of his life he developed congestion of the bases of both lungs, which accelerated his death.

He never murmured during his illness, and was very patient, but I think he realised his life's work was done. I am sure he would rather have died when unable to do his own work. He said "he would rather wear out than rust out."

He died on August 22nd in his 64th year, and was buried at Downend Church on August 25th, when a large concourse of people attended the funeral.

DEPUTY SURGEON-GENERAL USHER WILLIAMSON EVANS, M.D.

Dr. Evans, late of the Army Medical Department, died in Clifton on August 27th, in his 90th year. He was born in Ireland in 1823, and received his medical education at Dublin, Glasgow and Paris. He entered the army in 1846, and served as a volunteer in the Crimean War, the regiment to which he was attached, the 16th Lancers, being then at home. He was present at the battles of Alma, Balaclava and Inkermann, and did good service in the trenches before Sebastopol, where he helped to organise a transport service of mules to carry the heavy baggage and ammunition of the soldiers to the trenches. He was awarded the medal with four clasps, and the Turkish medal. He became Surgeon-Major in 1866, and retired from the army in 1871 to Westmeath, Ireland. Since 1876 he has lived at Clifton.

Dr. Evans was a keen sportsman, and was a well-known figure for many years as a follower of Lord Fitzhardinge's hounds. He leaves five sons, three of whom are distinguished officers in the army, and two daughters.

Local Medical Notes.

University of Bristol.—Students of the University have recently passed the following examinations:—

University of Bristol.—*M.B., Ch.B.—First Examination:* R. B. Britton, J. D. Champney, A. D. Symons, R. H. Tasker. *Final Examination:* A. G. T. Fisher, V. Pinnock, C. H. Hart, H. W. Goodden. *Part I only:* C. Kingston, E. Christofferson.

M.D. (Honours): J. W. Taylor.

D.P.H (Part I): W. Pomeroy, A. H. Finch, S. Bazalgette, T. Aubrey.

B.D.S.—First Examination: A. Williams. *Chemistry:* W. H. Greet, R. H. Turner. *Zoology:* W. J. Langford. *Second Examination:* A. W. Adams, F. K. Hayman. *Final Examination:* R. H. Basker.

UNIVERSITY OF CAMBRIDGE.—*M.B.:* P. A. Opie. *D.P.H.:* L. J. Short.

UNIVERSITY OF LONDON.—*Second Examination for Medical Degrees (Part II):* G. N. Welsford.

CONJOINT BOARD OF ENGLAND.—*Chemistry:* W. A. Jackman, E. Butler. *Physics:* W. A. Jackman, J. H. C. Eglinton. *Practical Pharmacy:* H. R. Husbands, D. Munro Smith, P. de S. Smith. *Anatomy and Physiology:* G. S. Terry. *Medicine:* H. W. Goodden.* *Surgery:* G. F. Fawn.* *Midwifery:* H. W. Cooke, W. Worger.

R.A.M.C.—R. M. Wright, M.B., B.S. Lond. (1st place).

APPOINTMENTS.

University of Bristol.—J. R. Kay-Mouat, M.A. Oxon., M.B., Ch.B. Bristol, has been appointed Demonstrator of Pathology. H. Chitty, M.B., M.S. Lond., and L. N. Morris, M.B., Ch.B. Bristol, have been appointed Assistant Curators of the Pathological Museum.

* Completes examination.

Very Sincerely Yours
Robert Fletcher